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ABSTRACT

This overview of interactive videodisc technology is designed to assist educators in finding the appropriate equipment and software for any specific application. The handbook may also serve as a starting point for many educators who know nothing of the technology and assist them in deciding whether this technology is worth pursuing as an educational tool in specific situations. Although not comprehensive, the listings reflect a good portion of the videodisc-related products available today and the prices provide a good indication of the general price range of specific items. The handbook contains 10 chapters: (1) Introduction to Videodiscs; (2) Overview of Laser Disc Systems; (3) Selecting a Laser Videodisc Player; (4) Video Playback Units; (5) Videodisc Interface Units; (6) Disc Player Peripherals; (7) Videodisc System Packages; (8) Educational Videodisc Software; (9) Interactive Videodisc Authoring Languages; and (10) Videodisc Care and Maintenance. Appendices include directories of laser disc players; television monitors and projects; laser disc interfaces; laser disc peripherals; laser disc system packages; videodisc software (listed by subject area); videodisc mastering options; interactive authoring languages; service information; and videodisc resources, which includes a manufacturer's index. (DJR)

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Association for Educational Communications & Technology

The Educators' Handbook To Interactive Videodisc

by Ed Schwartz

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Association for Educational Communications & Technology

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PREFACE

This handbook is designed to be a source of information for educators about interactive videodisc. It does not attempt to be a detailed reference of the technology. It is, rather, an overview of the technology, offering additional sources that you can consult for more detailed information. This should help educators find the appropriate equipment and software for any specific application. The book also serves as a starting point for many educators who know nothing of the technology, and assists you in deciding whether this technology is worth pursuing as an educational tool in your specific situation.

The listings of equipment and software contained here are the result of a search of the listed publications, plus attendance at professional conferences. Although there may be other products available that are not included in this handbook, the listings nonetheless reflect a good portion of the videodisc-related products available today. Because of the fast pace of the industry, many of the prices quoted here may have changed by the time this book is distributed. The prices listed do, however, still provide a good indication of the general price range of specific items. The products listed are all for use with NTSC (American) standard television equipment unless otherwise specified.

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1. INTRODUCTION TO VIDEODISCS

Rapidly changing technology confronts an educator with difficult choices in selecting new equipment. Will today's state-of-the-art equipment be tomorrow's Edsel? Obviously, educators must be careful in choosing a particular technology, making certain that it will play an important functional role in the education system. The laser videodisc system is such a technology. Not all videodisc systems are either as flexible as the laser videodisc systems or viable for all of the varied educational settings. The RCA capacitance system, for example, which was removed from the market in the spring of 1984, was not suited to most instructional uses. RCA's decision to withdraw its capacitance system left the laser technology as the only working videodisc format available to American consumers.

CAPACITANCE SYSTEMS

Because it is still possible to purchase a capacitance system in the secondary market, it is useful for educators to understand the features of that system. The capacitance videodisc system, marketed by RCA, was quite popular because a large selection of movies were available. The system works in much the same way as a normal audio record. There is, however, a difference in how the information is stored and retrieved from the disc. Rather than reading grooves, the stylus of the capacitance disc system works as one plate of a capacitor. The disc itself serves as the second plate with a nonconductive coating so the plates will not short out. As the disc spins, depressions or pits in the disc plate continually change the capacitance of the current coming from the disc. This change in capacitance determines the signal frequency. In this way, the player reconstructs the video signal to match the original recorded signal.

There are disadvantages to the capacitance system, making it difficult to use interactively in an education setting. For example, the capacitance disc is capable of storing 60 minutes of video material. Stereo sound is available with the later discs and players. With the video changing at 30 frames per second (much like the 24 frames per second of film), the disc will store 108,000 frames of information. A problem arises in that the disc spins at 450 rpm. With 450 revolutions per minute, there are 27,000 tracks available for frames (450 × 60 = 27,000). Thus, four frames must be grouped in each revolution (108,000/27000 = 4). Still frames, therefore, are difficult to produce and they use four times the normal space on a disc side.

Also, because of the disc materials used, any damage to the surface of the disc can destroy it. Protective sleeves are necessary to prevent damaged discs. Even with protective sleeves, the disc is not immune to wear from the stylus and the signal will deteriorate in quality after many plays.

In the early players, interactive functions were not possible. A later series of capacitance disc players offers many of the interactive functions previously found only in laser disc players. Unfortunately, the RCA systems still do not have the full interactive capabilities available on the laser systems. RCA qualified the new capabilities of the players by stating that they "provide a variety of interactive applications," not all interactive applications. Some of these features include the programed playing of any part of a disc by time or band; forward and reverse scan at 120 times normal speed in addition to the usual 16 times normal speed; dual channel (or stereo) audio that can be played separately; and a "page" feature that allows still framing on special discs that have been produced for this purpose.

Even with these new features, the capacitance system has a long way to go to match the interactive range and superior video and audio quality of the laser system.

LASER SYSTEMS

The laser videodisc system is an optical system reading reflected light from the disc spinning at 1800 revolutions per minute. At this speed, one revolution can play back one frame of video information. This allows the laser to read one revolution over and over, creating a freeze or still frame. A normal 12-inch interactive (CAV) disc can play up to 30 minutes on one side. This offers 54,000 frames or spaces for information storage (1,800 × 30 = 54,000). An 8-inch disc can also be used, which holds 24,000 frames or 13 minutes and 20 seconds of information.

With the interactive disc, you can search for and display each of these 54,000 frames in less than three seconds. One disc can store 54,000 pages of information or 54,000 individual pictures that you can retrieve at will. With the aid of a small microprocessor (which is standard on selected players), you can access the information on the disc very easily.

The noninteractive (CLV) laser disc continually changes speed to fit more information on the disc, playing up to 60 minutes of video with stereo audio on one disc side. Digital audio tracks are also available on selected CLV discs. These audio tracks can only be read by players specifically designed for that purpose.

The disc itself is made of a metalic substance covered in thick clear plastic so you can handle it without damaging the quality of the recorded information. In fact you can touch, scratch, drop, and soil it with no ill effects to the recorded signal. Only the laser beam comes in contact with the disc, preventing any wear on the disc when it is played. The disc is not indestructable, but with reasonable care, a laser videodisc will last indefinitely.

In summary, the laser videodisc system can perform all of the normal playback functions common to the capacitance system but with greater flexibility. The laser system has still-frame and slow-motion capabilities, random access of 54,000 individual frames, and normal play functions. The laser disc is impervious to wear whereas the capacitance disc will wear in time.

The following figure compares both the capacitance system and the laser system. In each case the figures are based on top-of-the-line systems with all available options.

Capacitance	**Laser**	**System Feature**
No	Yes	Store computer information
Yes*	Yes	Interface with home microprocesser
No	Yes	Download data from the disc
Yes	Yes	Rapid access to anywhere on disc
No	Yes	Random access to frame numbers
Yes*	Yes	Freeze frame
No	Yes	54,000 color frames per side
No	Yes	Full set of interactive functions
Yes*	Yes	Stereo audio
Yes	Yes	User friendly equipment
Yes	Yes	Low cost of playback equipment
Yes	Yes	Low cost of discs
Yes	Yes	No erasure of information
Yes	Yes	No special storage environment needed
No	Yes	No deterioration of video image
No	Yes	Unlimited disc life

*With selected discs and players

It should now be obvious that the laser disc system, with its complete interactive capabilities and virtually indestructable discs, is very desirable for education applications. In the classroom the possibilities for the laser disc system are nearly endless. Its unique capabilities cannot be found in any other single medium. The laser system truly surpasses the limited capabilities of the capacitance system. Videodiscs and interactive video will be the educator's tool in the classroom of tomorrow—and they are available to the educator today!

CHAPTER 2. OVERVIEW OF LASER DISC SYSTEMS

The delivery systems for the laser videodisc cover a wide range of possibilities. The main difference among the systems is their varying levels of interactivity. The disc systems range from a stand-alone system that only plays back recorded material to highly interactive systems that employ the use of a host computer to run the disc.

One of the unique features of the laser disc is that interactive programing can be encoded either on the disc and downloaded to a microprocessor in the player, or on a separate floppy disc driven by a host computer. This addresses the main limitation of the laser disc system: it is a read-only medium. Read-only means that the end user cannot change the materials on the disc—including the encoding. Just like the information on a phonograph record, the information recorded on the videodisc cannot be changed. When you couple the videodisc with a microcomputer, however, it can become extremely flexible in any setting. You can change and update properly designed programs easily on the host computer. You can superimpose graphics from the computer on top of the videodisc picture allowing modification of the pictures as well.

HARDWARE OVERVIEW

The basic piece of hardware for a laser disc system is the laser disc player. Players are categorized by their level of interactivity. The Level Zero player has no interactive capabilities. The Level Three player, on the other hand, can be highly interactive. The helium-neon lasers of the early players are now being replaced by the longer lasting solid-state laser diodes.

The other necessary piece of hardware is a monitor. Although the system will work with any standard black-and-white or color television, professional television monitors will yield much better picture resolution. High resolution is necessary for classroom use so that students can read screen text clearly. Large classrooms need large image television projectors that offer the best possible clarity and resolution.

The higher the desired level of interactivity, the greater the need for a microcomputer connected to the system. All of the microcomputer's educational characteristics, including complex branching, can be incorporated by means of a videodisc/computer interface. You must take care to ensure that the interface is compatible with all of the hardware components and that it is capable of performing all the desired functions.

Authoring languages allow anyone, regardless of programing experience, to create lessons with very complex computer routines. These authoring languages are generally programs that allow you to insert information into preprogramed routines. You then put these routines in any order you choose. The computer does nearly all the work through a series of questions and prompts for the nonprogramer.

STRAIGHT PLAY: LEVEL ZERO

The straight play system is a consumer model of the laser disc player. It is a stand-alone system that reqires little or nothing from the user. Once the system is in place and connected to the monitor, all you have to do is press the "play" command. There are several options available, and you can activate these options by the simple touch of a button or slide switch. Some options are commonly available on most machines; others vary from player to player.

All of the options available on the Level Zero players are also available on the higher level players. On the Level Zero players, however, you must perform all of the operations manually. Level Zero players offer forward and reverse motion at variable speeds plus a few fast-speed options in either direction. You can also identify frame numbers and select audio channels. A major limitation is the lack of direct searching capabilities to specific still frames.

Standard Videodisc Control Features

Power—This function switch turns the AC current on or off.

Play—Starts the player after the disc has been put into an alternate mode, such as pause.

Reverse—Allows the machine to play backward at normal speed.

Stop—Stops the disc on a single frame and waits for a new command.

Pause—This is the same as Stop on most Level Zero players. Some players will automatically display a blank screen in this mode.

Index/Frame Display—This feature enables you to see which frame of video you are viewing. It is used for finding information in single still frames as well as starting points for sections of video. Frames 1 to 54,000 are available.

Scan Forward—This moves the disc forward at a fast rate of speed and allows for fast identification of the video images.

Search Forward—Same as Scan Forward.

Scan Reverse—This provides the identical features as Scan Forward, but with the disc moving backward.

Search Reverse—Same as Scan Reverse.

Fast Forward—This function advances the disc image at three to five times the normal rate of speed, depending on the player.

Fast Reverse—This function moves the disc image backward at three to five times the normal rate of speed.

Still Forward—This advances the disc forward one frame at a time.

Step Forward—Same as Still Forward.

Still Reverse—This moves the disc backward one frame at a time.

Step Reverse—Same as Still Reverse.

Audio 1—This switch controls the first audio channel, which corresponds to the left channel on standard stereo systems. The switch can be toggled on or off.

Audio 2—This switch controls the second audio channel, which corresponds to the right channel on standard stereo systems. The switch can be toggled on or off.

Slow Forward—This feature allows you to put the disc into slow motion by means of a slide switch located on the face of the player.

Slow Reverse—This puts the disc into reverse slow motion by means of a slide switch located on the face of the player.

INTERACTIVE: LEVEL ONE

A Level One player is the top-of-the-line consumer player. It contains all of the features contained in the Level Zero player and more. The Level One player usually comes with a small hand controller that lets you operate the player either in a remote mode or using the controls on the player itself.

The two primary features of Level One players that are not present on the lower-level players are Search and Automatic Stops. These stopping features include Chapter Stop and Picture Stop. They allow you to stop the disc at exact frame locations, thus providing natural divisions in the materials presented or allowing you to address specific still frames.

Several Level One players feature interface ports to upgrade the system. Random access time varies from one player to the next. Short jumps are usually under one second, but the maximum search times can be up to fifteen seconds.

Search Functions

The Search functions of the Level One player are very valuable and, with proper software, give the unit a high degree of interactivity. Think of the disc as an "electronic textbook" with 54,000 pages (frames) of materials. With the Search function, you can easily go to any page (frame) or chapter of information.

You can access any still frame on the disc by using the hand controller. You merely enter the five-digit number, from 00000 to 54000, into the small computer in the player and, with the press of the Search key, the frame will appear on the screen—usually in less than fifteen seconds. This function allows you to move anywhere on the disc at any time. If the disc has Chapter Stops, the Search key can also move you to any given chapter of material.

Access Time

Access Time is the term used to designate the worst-case search time from any two random points on the disc. If the access time for a player is five seconds, for example, the player can Search from frame 0 to frame 54,000 in five seconds or less.

Chapter Stops

The Chapter Stop can only work if the disc contains encoded Chapter Stops. This means that there is a digital code in the vertical or blanking interval of the video signal. With the Chapter Search command, you can then move directly to any encoded chapter by using the hand controller. The player ignores the Chapter Stop codes when in the normal Play, Forward, or Reverse modes; you can access the stops only through the Chapter Search.

Picture Stops

Picture Stops, like Chapter Stops, also must be encoded on the disc, using a digital code in the vertical interval of the video signal. The disc will stop automatically on an encoded Picture Stop frame from the Play or the Slow Forward/Reverse modes. The main distinction between Picture Stop and Chapter Stop is that you cannot access the former in the Search mode. Together, the Chapter Stop and Picture Stop give you the means to locate quickly and display an automatic still frame.

Instant Jump

This feature, found on many of the high-level players, is available on the Hitachi and Philips Level One players. Instant Jump allows the disc player to move instantaneously by random access from one frame to another within a specified tolerance. The Hitachi VIP-9500 player can jump 180 frames forward and 100 frames in reverse in less than five milliseconds. This eliminates screen blanking or breakup from one frame to the next.

Other Level One players with this feature are the Hitachi VIP-9550 with a 200-frame jump in either direction, and the Philips VP-935 with a 100-frame jump capability in either direction. Level Three players are also equipped with the Instant Jump feature. The Philips player can jump up to 250 frames in less than five milliseconds. Pioneer uses the term Multiple Track Skip to denote Instant Jump. Like the Philips player, it is capable of jumping up to 100 tracks in less than five milliseconds.

INTERACTIVE: LEVEL TWO

The Level Two videodisc player is designed for industrial and educational applications. These players have built-in microprocessors allowing you to use the player as a stand-alone fully interactive system.

The onboard microprocessor uses at least two forms of memory to store and retrieve information. One form of memory is the Frame Recall storage. You can store and retrieve a five-digit frame number in a file in any order. The important frames needed for any given application can be identified and stored for faster access. The other common form of memory is the Program storage. This allows you to create computer-assisted instruction (CAI) programs. Such programs can include user input functions, branching, and other normal CAI features as well as timed sequences of Still Frames or real time motion.

These players also feature an RS-232C parallel interface for system upgrading. Random access time is usually under one second for short jumps, and up to five seconds for maximum search distances.

INTERACTIVE: LEVEL THREE

Any disc player interfaced with a microprocessor is a Level Three disc system. The Level One players with computer ports can be interfaced into a Level Three configuration; so can the Level Two players with interface ports. All of the disc players on the market today can be upgraded to a Level Three system with the exception of the Pioneer LD-660. Several advantages of the Level Three system are obvious. There is a large increase in the available memory, and the presence of high-level math functions allows more sophisticated programing. This technology is the combination of computer-assisted instruction (CAI) and high-quality visuals.

Currently a new breed of players are on the market designed to work exclusively with microcomputers. These players do not include controls on the player or have provisions for handsets. The players are totally dependent on the host microprocessor for control. Aside from the lower cost of these units, they allow you to design more specific functions for the player.

INTERACTIVE: LEVEL FOUR

The definition of this level of interactivity is still being debated in the videodisc field. Level Three went a step beyond the disc player to the computer for control. Many look to Level Four for use of overlayed text, graphics, and other visual information from the external computer. This combination allows you to use all of the computer's power in conjunction with the videodisc player. Visual displays, combining both real video from the disc and text or graphics from the computer, provide an extremely high degree of flexibility for all educational applications. This overlay capability, along with input devices including touch screens, joy sticks, light pens, bar code readers, voice activated systems, or bit pads, can greatly increase the interactivity of any system and promote a more efficient means of attaining particular objectives.

The Level Four system is the highest level of interactivity that is currently available on the market. While it is basically a modified Level Three system, there are no players that are designed solely for this application. Obviously, Level Three players would be the ones best suited for this system.

CHAPTER 3. SELECTING A LASER VIDEODISC PLAYER

LEVEL ZERO PLAYERS

The most important factor in selecting a videodisc player is its desired application. Level Zero players are the most inexpensive, but they are also the most limiting. They do not allow for any interactivity.

There is one Level Zero player currently on the market with limited usage in the educational field—the Pioneer LD-660. This player offers Still, Slow, Scan, and Pause functions in addition to the normal Play and Audio functions. It will not show frame numbers, but it does have a relative position indicator.

Pioneer LD-660
Access Time: N/A
Price $299

LEVEL ONE PLAYERS

Level One players are the most economical for many applications. These players allow the full range of interactive features along with the ability to interface with a microprocessor. The access time on these players is generally slow.

Several Level One players are currently on the market. All of these players have a serial computer interface port that, with the addition of a microprocessor, will allow more sophisticated applications (see Level Three applications). The costs range from $499 to $1,550, and represent the consumer line of disc players.

Pioneer, Hitachi, Philips, and the consumer divisions of North American Philips Corporation (Sylvania and Magnavox) all offer Level One players. The two Philips consumer players are the Sylvania VP-7400SL at $750 and the Magnavox VC-8040GY at $750. The Pioneer players are the PR-8210 at $499, the LD-700 at $800, and the LD-V4000 at $900. The Hitachi VIP-9500 lists for $1,550. It should be noted that many of these prices are the suggested list prices; with some comparative shopping, you can find many of these players at substantial discounts. Quantity purchases will also permit you to get a lower price.

One player that stands out from the others is the latest addition to Pioneer's line of players. The CLD-900 is a multipurpose player that is capable of playing compact audio discs (CDs) as well as the 12-inch and 8-inch videodiscs. This player lists at $1,200 and has the same basic video characteristics as the LD-700. In the digital audio mode it is comparable to many of the top CD players. Institutions that are involved in music instruction should find this unit very convenient because it offers the same quality of performance as separate players would provide. This also opens the way for videodiscs that have true digital audio. These discs will have both digital and analog audio encoded on them so any videodisc player can play the disc. This player, however, would be required to reproduce the digital track. Currently, plans call for these discs to be pressed only in the CLV format. They will be capable of storing only 55 minutes of video and digital/analog audio.

The two main issues you must weigh in player selection are cost and function. The Level One players with access times over six seconds all cost less than $1,000. The higher cost of other players is attributable to their very quick access time (three seconds or less), while the less expensive machines have much slower access times (maximum of six to fifteen seconds). The other factors involved in the cost of the player are the degree of sophistication of its interface capabilities and the instant jump feature. Level One players can be used with an optional remote handset without the computer for added flexibility.

Hitachi VIP-9500
Access Time: 3 seconds
Instant Jump: 180 frames forward, 100 frames reverse
Price $1,550

Hitachi VIP-9550
Access Time: 3 seconds
Instant Jump: 200 frames forward, 200 frames reverse
Price $1,550

Magnavox VC-8040GY
Access Time: 10 seconds
Price $750

Philips VP-935
Access Time: 3 seconds
Instant Jump: 100 frames forward, 100 frames reverse
Price $1,395

Pioneer LD-700
Access Time: 10 seconds
Price $800

Pioneer CLD-900
Access Time: 10 seconds
Price $1,200

Pioneer LD-V4000
Access Time: 6 seconds
Price $900

Pioneer PR-8210
Access Time: 15 seconds
Price $499

Sylvania VP-7400SL
Access Time: 10 seconds
Price $750

LEVEL TWO PLAYERS

Level Two players are extremely versatile units, but they are also the most expensive. If you need a stand-alone system with full interactive capabilities, you need a Level Two player. The parallel port and quick access time of the Level Two player make it desirable for many of the more sophisticated applications.

Level Two players offer several options in terms of memory capacity. The onboard microprocessor of the Sony LDP-1000 has 5K of memory (5120 bytes). This player has been designed to allow the reading of chapter stops. Pioneer's Level Two player, the LD-V6000, has 7K of memory (7156 bytes); it is not capable of searching for chapters, but it will read picture stops. The players also have an RS-232C port that allows for upgrading to Level Three as well as a combination of onboard computer routines and host computer commands. The Pioneer has a built-in interface that allows you to connect a microcomputer directly to the disc player without any special "black boxes." The Sony player costs $2,500 and has a five-second access time. The Pioneer costs $1,490 and has a three-second access time.

Pioneer LD-V6000
Access Time: 3 seconds
Memory: 7K
Price $1,490

Sony LDP-1000A
Access Time: 5 seconds
Memory: 5K
Price $2,500

LEVEL THREE PLAYERS

The Level Three players are the most versatile videodisc players available. They offer the speed of the Level Two players and the lower cost of the Level One players. They demand, however, a greater understanding of computer hardware and programing than do the other levels. This means that they are not always as "user friendly" as other players.

The Level Three player can perform many unique functions that are made possible with a dedicated computer. This player is best suited for individual learning applications. The Philips VP-832 player has a five-second access time and costs $1,395. The Pioneer LD-V1000 costs $1,200 and has a three-second access time.

Philips VP-832
Access Time: 5 seconds
Instant Jump: 250 Frames
Price $1,395

Pioneer LD-V1000
Access Time: 3 seconds
Instant Jump: 100 Frames
Price $1,200

LEVEL FOUR PLAYERS

Level Four, like Level Three, does not have a special player associated with it. Any disc player that is interfaced with a computer is considered to be Level Three. The addition of external input devices to the computer and high resolution color graphic overlays will bring the system to Level Four.

Appendix A lists all of the laser disc players discussed and their specifications. You should note that the majority of the early players were top-loading machines. The new players have gone to a front-loading system. Pioneer's newest players (LD-700, LD-V4000, and LD-V6000), the Magnavox VC-8040GY, the Sylvania VP-7400SL, and the Hitachi VIP-9550 all have front-loading features. This can be useful in situations where vertical space is limited.

CHAPTER 4. VIDEO PLAYBACK UNITS

The most misunderstood component of the laser disc system is the video playback unit. There are two types of units to choose from: a television receiver (the kind of television most people have at home) and a television monitor (a higher quality unit usually found in educational or industrial settings). Although either video unit can reproduce the laser disc image, the high video quality of the laser disc often demands greater resolution than most home televisions can offer. A major difference between monitors and receivers is in the type of electronic signal that each will accept as an input. There are two types of television signals that can be used to reproduce the videodisc image: an RF signal and a composite video signal. (A third type of signal—RGB--is common in the high-quality reproduction of computer graphics.) Each of these signals yields a different picture reproduction quality. RF and composite signals are standard outputs on all videodisc players. RGB output must be created by a computer, normally for computer graphics overlay applications.

TELEVISION RECEIVERS

For situations that do not require the highest quality picture reproduction, a normal color television will give you an adequate result. The quality of the television receiver is limited by the electronic signal that it uses. The RF (radio frequency) signal used by the receiver mixes the audio and video signals into one. The quality of both audio and video signals are compromised by this method. Although the hardware necessary to reproduce this signal is the least expensive option, the quality of the television picture does not adequately reflect the quality of the images that have been recorded on the discs.

TELEVISION MONITORS

The more demanding videodisc applications require the use of television monitors. A monitor uses a composite video signal to reproduce an image, and this gives the best picture quality in color and clarity. The audio signal in this format is processed separately. Because the composite signals are processed separately, there is a substantial improvement in both the audio and the video as compared to an RF signal. A monitor costs more than a receiver, but the increased quality of the picture is well worth the higher cost. Because a monitor is not equipped to receive commercial television signals by antenna or cable, you need a separate tuner to use it for normal television reception. Many combination units are available that combine the features of receivers and monitors, and these cost little more than the monitor alone. If television reception is a requirement, a receiver/monitor might be the answer.

Many television monitors will also accept the RGB (red, green, blue) signal for a high-quality image from a computer. The RGB signal is the fundamental video signal consisting of the primary colors. It produces clear images and good color from the computer because it receives the least amount of processing. Computers can produce the RGB signal in one of two formats: analog or digital. Unfortunately, there is little standardization in the RGB output from one brand of microcomputer to the next. You must be very careful in the hardware configuration, therefore, to ensure the compatability of equipment. The RGB signal will produce the best results in the use of graphic overlays with the videodisc image, but it also demands the most expensive television monitor.

It is also important to understand that for each type of playback unit, only a limited number of viewers can comfortably see the image on the screen. As a general guideline, you should have no more than twenty people viewing a 19-inch monitor. For the best results, you should select television monitors and receivers with specific applications in mind. A large-screen projector can be the answer in many situations, but you must be certain that the projector will give adequate results with your room configuration and degree of image resolution.

TELEVISION PROJECTORS

There are two basic types of large-screen television projectors from which you can choose. The first type is a self-contained unit that has a projector built into a cabinet. This type of unit is fairly mobile, and has a screen that is connected to the unit. These units are fairly inexpensive and are often found in stores for home use. They yield acceptable results in the proper environment. Detailed images can often be blurred, however, if the machine is not properly maintained.

The second type of system projects the image onto screens of all sizes (much like a movie projector) through the use of special lenses. These units generally are permanently mounted in large rooms, including auditoriums. Many of these units can produce images up to 25 feet wide. All of these units can project the image from in front of the screen (like a movie projector); many also can reverse the image and project from the rear of the screen. Although these units are highly effective in large-group situations, they can be very difficult and expensive to maintain. For example, the light valve used in some projectors has a life expectancy of about 1,000 hours. Replacing the light valve costs about $17,000 for parts alone, so the use of such a system would have to justify the cost not only of purchase, but of this foreseeable repair and maintenance as well.

On the whole, large television monitors not only are more durable and take less maintenance than do the projection units, but they also have a sharper picture. The self-contained projectors are fairly inexpensive and offer a minimal amount of maintenance. They also have the larger screen and thus can accommodate more viewers. Projectors with a very large image and rear screen capabilities are expensive and should be considered only when a capable technician is available.

Appendix B lists selected television monitors, self-contained television projectors, and mountable television projectors. This listing in no way represents all of the units in the market. The listed units are known in the field and are readily adapted to videodisc applications. It should be stressed that television specifications do not always give an accurate representation of the video image. Because television image reproduction is very subjective, you should view every television unit prior to purchase.

CHAPTER 5. VIDEODISC INTERFACE UNITS

NONCOMPUTER INTERFACES

Audiotape/videodisc interfaces offer low-cost alternatives to a microprocessor when you need a slide show or other programable presentation. These interfaces require an audiocassette recorder, with the first track used to carry an audio control signal for the videodisc commands and the second track for narration, music, or other audio information. This kind of interface system is versatile, inexpensive, and easy to use. Its limitation, however, is in that full interaction with the user is not possible. To explore fully the many interactive capabilities of the laser videodisc system, you need to use a computer.

DiscMate 1.5
$450

Video Vision—ATVI
$125

Whitney—A1320
$100

COMPUTER INTERFACES

For computers to control videodisc players, system hardware and software must be compatible. Sometimes you can directly connect computers and videodisc players with RS-232C ports to obtain the desired results. More often than not, however, you will need an interface unit to achieve compatibility.

Interface units for videodisc systems provide the link between the player and the computer. These units come in all shapes and sizes. You can install an interface card inside the computer or use a separate external unit. Some interface units do more than others, so you need to know their capabilities.

The simplest interface units control only the videodisc player. The main role of this interface is to facilitate the performance of all desired functions through the host computer. These are the functions that you would normally access through the interactive player controls in the handset.

The level of interface units will also switch displays onto a single screen, relieving you of the need to watch both the computer screen and videodisc screen at the same time. This can be desirable in many situations, because you can run a small amount of text on the same screen that you use for visuals and thus keep the learner's attention focused on just one screen. Sometimes, however, you may want to keep the images separate in order to run text on one screen at the same time that you run visuals on the other. This kind of interface unit allows you to switch between these modes by giving software commands to the interface hardware.

A more sophisticated interface group enables you to superimpose the graphics capability of the computer over the video image from the disc. This interface combines the functions of several units into one peripheral. These interfaces, normally expensive, reconstruct the NTSC video signal from the videodisc and the RGB signal from the computer, making them compatible. The added capabilities of the overlay function for appropriate applications are usually well worth the extra expense.

The following interface compatibility chart lists many of the interfaces currently available as well as their compatability with several microcomputers. The chart also notes two of the important features of interfaces: single-screen switching and overlay capabilities. Refer to Appendix C for detailed information on a specific interface unit.

Interface Computer Compatability Chart

Interface	AP	AT	CM	IB	SO	TI	SS	OL	Price
Allen—UVC	*	*	*	*	*	*		I	$1,200
Allen—VMI	*						*	O	575
Allen—MVP	*	*	*				*		150
Anthro—Digital—Omniscan	*						*		250
BCD Associates—VIPc				*			*	O	1,195
Bell & Howell	*						*		600
Destron	*						*	I	650
Digital Controls—Red Card	*						*		500
Digital Controls—Red Max	*	*	*	*	*	*	*		550
IEV—IEV-40				*			*	O	550
Interactive Training Syst				*			*	I	2,995
Jam, Inc.—Jam Card	*				*				395
New Media Graphics DM-1000	*	*	*	*	*	*			90
Online—VDC-100				*			*	O	350
Online—GL-512				*			*	I	1,500
Pioneer—SIA IU-03	*	*	*	*	*	*	*		300
Symtec—DVA Card	*						*		350
Symtec—Sony Card	*						*		350
Video Vision—VAI II	*						*		125
Visage—V:Link 1000				*			*	I	1,150
Visage—V:Link 1500				*			*	I	1,850
Visage—V:Link 1550				*			*	I	2,150
Visual Database Systems				*			*		65
Whitney—PC 500-A				*					990
Whitney—SM 500-A					*				895
Whitney—A3001A	*								695

AP=Apple
AT=Atari
CM=Commodore
IB=IBM-PC
SO=Sony SMC-70
TI=Texas Instruments
SS=Single Screen Overlay
OL=Overlay (I=included; O=optional)

CHAPTER 6. DISC PLAYER PERIPHERALS

Peripherals are add-on devices that offer new dimensions to laser disc system capabilities. Many of these peripherals, such as touch panels and light pens, are also commonly used in computer-assisted instruction. These common devices, plus many of the special peripherals for videodisc systems, make the videodisc the most powerful teaching tool available today. Listed below are short descriptions of many of the peripherals available for use with the videodisc technology.

GRAPHIC OVERLAY

Graphic overlay devices are very important to interactive video lessons. These devices allow you to superimpose computer generated graphics or text over the television picture from the videodisc. You can display information on the television monitor in a single-screen mode from a computer or the disc.

STILL FRAME AUDIO

The still frame audio adapter is designed to read specially encoded discs. You can play these discs on any laser disc player, but the special encoding can only be decoded by this device. This digital device compresses analog audio so that it uses only about one thirtieth ($\frac{1}{30}$) of the space that it would normally occupy on the disc. When you only need still frames visually, but also require either narration or some form of audio, you do not want to waste space by repeating the same video image on the disc. With special encoding, you can compress the audio portion so that 40 seconds of audio and video are condensed into just a few frames. Compression allows you to store about 1.3 second of audio in the space of one visual frame.

NOISE REDUCTION

The CX noise reduction system is unique to laser discs. It is a built-in feature in many of the players, but you can also purchase it separately. This system claims to improve the signal-to-noise ratio of the reproduced discs by as much as 10 dB for a total of 70 dB (1kHz, 100% mod. IHF A). When you connect this device to your system, you only have to turn it on; you do not have any adjustments to worry about.

INPUT DEVICES

Several types of touch screens are available that allow you to enter information into the system's computer simply by touching the appropriate spot on the television screen. The infrared system and the capacitance grid system are the most common. Although touch screens are relatively expensive, they provide a real advantage for many situations where use of the keyboard can impede learning.

Graphics tablets, light pens, and joy sticks are inexpensive alternatives to the touch screen. Generally you can purchase these devices as add-ons through computer manufacturers, and then integrate them into any microcomputer system. Like touch screens, these alternative devices are useful for several instructional applications, especially with lessons for young students whose concentration is easily broken when they cannot find the correct key on the keyboard. Alternate input devices facilitate young students' learning by making it easier for them to enter answers.

VOICE SYNTHESIZERS

Voice synthesizers can offer speech output as a way of communicating with the user. Speech output devices can enhance many applications of videodiscs, especially where written text is a problem.

Information on several peripherals is listed in Appendix D. This list is not exhaustive, but it provides an indication of the prices and capabilities of similar items.

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CHAPTER 7. VIDEODISC SYSTEM PACKAGES

As the demand for interactive video technology increases, the need for workable systems also increases. Companies now offer complete system packages already configured to serve particular applications. Many of these are "turnkey" systems—ones where you only need to plug them in and "turn the key on." These system packages make the technology even more accessible to people who are intimidated by machines.

Some of these systems are self-contained, and some are complete with large cabinets that allow you to move the system where you need it. Other systems supply the interface, authoring system, and demonstration materials, allowing you the opportunity to provide other components (computer, television receiver or monitor, and disc player). In this way, you can configure a system using already-existing equipment.

Most systems come with a standard authoring language plus a demonstration package that enables you to familiarize yourself with the system in a short period of time. This package takes you through all the steps you need to know to design the videodisc program.

As each system is dependent upon the host computer, all videodisc system packages are Level Three systems. The large price differential among systems is attributable to several factors. One of these factors is the system's ability to overlay color graphics and text from the computer. A system that can perform this function will cost considerably more than one that cannot. This capability also indicates that the system requires more sophisticated software to operate. The price of the system rises with increased interface capabilities. The price of the computer itself can also be an important factor. An IBM-PC, for example, is much more costly than an Atari-800. The cabinet or enclosure that comes with several systems adds a sizable sum to the total price. So do any peripherals that are included in the system.

Several systems require minicomputers or mainframe computers, and allow you to network several terminals on one computer. These systems can be desirable in many situations. The primary manufacturers that support such systems are Control Data Corporation with the PLATO system, Digital Equipment Corporation with the IVIS system, Hazeltine Corporation with the MicroTICCIT system, and WICAT Systems. Each has its own high-level authoring features and ready-to-run software.

Appendix E outlines several currently available videodisc system packages. If you choose one of these systems, you should carefully consider the capabilities of the host microcomputer and all functions you need for specific applications.

CHAPTER 8. EDUCATIONAL VIDEODISC SOFTWARE

Videodiscs are produced in two formats: Constant Linear Velocity (CLV) for limited interactive uses, and Constant Angular Velocity (CAV) for highly interactive instruction. The CLV format allows only for Chapter Stops, while the CAV format allows all interactive functions including still frames and random access to any disc frame.

While total interactivity may be desirable, you can fill many educational needs using the limited functions of the linear (CLV) discs. You can teach visual arts, music, and dance, for example, using only Chapter Stops to access major division points of the work.

In science or mathematics, today's teaching styles demand greater interactivity. As the list of educational videodiscs increases, there will be a marked emphasis on highly interactive programs.

The term "linear disc" refers to a CAV or CLV disc with materials that are, from an educational perspective, limited in their interactive possibilities. The discs are normally designed for straight play applications.

An interactive disc is a CAV disc that has materials suitable for programing with an internal or external microprocessor.

A programed disc is an interactive CAV disc that has available computer software or, in some cases, necessary computer software either on diskettes or on the videodisc itself in the Level Two applications.

Appendix F lists current educational videodiscs on the market. All the discs listed are pressed in the NTSC television standard and are designed to be used in videodisc players sold in America and other countries using the NTSC standard. The hardware and software requirements of each disc are identified whenever possible. The programed discs are the discs that need special attention from the hardware and computer software perspective. Linear and interactive discs are functional on any system.

Several mail order houses sell commercial laser discs at about 10 percent less than retail cost, and many of their discs are useful in the educational setting. All of the discs distributed by Pioneer Video can be purchased through these mail order companies. Instant Replay also carries discs from Pioneer Video Japan (noted as imported titles). Be careful when purchasing discs in this manner because many familiar titles are dubbed in Japanese or have Japanese subtitles. If you are ordering by phone, do not hesitate to be specific in stating what you want or do not want. Addresses and telephone numbers for several mail order companies are listed in Appendix F.

VIDEODISC MASTERING

The other aspect of the videodisc itself is the mastering and pressing of the discs. The most efficient way for you to get started in producing your own discs is to share with others the cost of pressing a disc. This option allows you to pay only for the space that is absolutely needed on a disc. Several groups offer this service and usually offer production services to those clients who do not have adequate production facilities. APh Technological Consultants offer a program called Share Disc. They press shared discs once a week with a one-week turnaround time. They offer a variety of production services as well. Comsell has an open disc service that offers a shared disc pressed at least once a month; production services are also available. Learning Link and IICS (International Interactive Communications Society) also have similar programs with production services as an option. In Canada, 3rd Wave Media Consultants will offer many of the same services.

Another inexpensive way to master a disc is to use the services of a company such as Spectra Image. This company will press a 25-minute CAV disc for $300 in 24 hours. The video and audio quality of these quick discs is not as good as that of discs pressed in the normal fashion. They are meant to be low-cost proofing discs that can be used to check frame numbers and test interactive programing.

Laser Video has the same type of limited-quantity, fast-turnaround service, but they give you the quality and full 30-minute storage capacity available from the larger mastering facilities. Laser Video will provide a 30-minute CAV or 60-minute CLV disc in 24 hours with a high degree of quality control for $2,000.

The next group of companies produce quality-controlled videodisc masters and can replicate them in large quantities. Each company has special arrangements for digital dumps, special encoding, 24-hour turnaround, and packaging. This book does not discuss the production of videodiscs, but Appendix G offers a resource for those interested in producing their own materials. It lists the names and addresses of the primary companies involved in the technology as well as comparison charts outlining set-up and per-disc costs of each volume mastering facility in the United States.

CHAPTER 9. INTERACTIVE VIDEODISC AUTHORING LANGUAGES

Authoring languages used with videodisc players are computer programs allowing an individual who has no computer background to design lessons for videodiscs on a microcomputer. Each language is designed to be compatible with one of the major computers on the market. It is crucial in the selection of an Authoring language that you select the language that is correct for the microcomputer that you will be using.

The most common system is menu driven. In this kind of system, a series of menus takes you through the programing possibilities and allows you to make decisions based on available options. This system is very easy to use and requires no understanding of computers. All of the actual computer code is written by the authoring language program based on your responses to the menu questions. The addition of peripheral devices is nicely accommodated with most languages.

Other authoring languages offer more versatile options, but they generally require more knowledge of the hardware and of computer programing. Appendix H lists several systems that are compatible with interactive videodisc applications.

CHAPTER 10. VIDEODISC CARE AND MAINTENANCE

VIDEODISC CARE

Videodiscs themselves are quite durable. They are, however, not indestructable! The discs, when abused, can crack or warp. Minor scratches on the disc surface do not normally affect the playback. Large scratches or foreign substances on the disc will affect the playback. The only way to ensure that the discs will always play correctly is to handle them with care.

The easiest way to eliminate possible problems is to handle the discs as if they were phonograph records. Store the discs standing on end on a shelf away from the sun and heat sources. Do not place the discs on top of the player, amplifier, or other warm equipment. Handle the discs only by their edges and center. Although the plastic coating on the disc protects it from damage, discs will not play correctly if they are warped, dirty, or scratched, and they may damage the player. The discs should be wiped clean with a soft cloth before each use, and should be at room temperature before they are played. Moisture may condense on the surface of the disc and affect its performance.

Remove the tight cellophane wrap that seals most newly purchased disc jackets as soon as possible. This cellophane can tighten around the jacket and may warp the disc if it is stored that way for a long time.

Testing for a warped disc is easy. Place the disc on a flat surface and check to see if the disc is touching the surface on all sides. If a gap exists under any part of the disc, there is a potential problem. If the gap exceeds the thickness of a nickel, you need to flatten the disc. You can do this by placing the disc between two flat surfaces with evenly distributed weights on top. A day or two in this improvised press should put the disc into playable condition.

SYSTEM ENVIRONMENT

The environment necessary to support a videodisc system is fairly reasonable. The room temperature should be between 45 and 95 degrees Farenheit (5 to 30 degrees Centigrade), with humidity ranging between 0 and 90 percent. The optimal condition, of course, lies somewhere in between. It is wise to let equipment warm up for a minute or two if it is moved from a cold room to a warm one. This will allow any moisture that has collected to evaporate. Although there probably is little chance of damage, the more care you give a system, the longer it will last. In equipment placement, be certain that the equipment has adequate ventilation. Heat will build up very fast in enclosed areas such as cabinets, and this can result in serious damage.

HARDWARE MAINTENANCE

Repair and maintenance should be performed by a knowledgeable person. You should allow for maintenance and repair of equipment in your budget before problems arise. Most of the problems you are likely to encounter will be minor, but even minor problems can make a system inoperable. Many companies offer service contracts for selected hardware. You also might arrange for service from the dealer that supplied the hardware. Although it is unlikely that you will need major repairs for the hardware listed, you should consider some type of service contract. If you work in a large institution, you might already have a contract that covers all video equipment or computer equipment, or you may be able to add more items to an existing contract.

One company that provides this service is the Warrantech Corporation. This firm will provide extended warranty coverage on most videodisc-related items. Based in New York, Warrantech has a chain of authorized service centers in all fifty states. The extended warranty begins upon the expiration of the original manufacturer's warranty on labor or parts, whichever occurs first. The coverage can extend up to five years from the original purchase date of the item. Appendix I lists Warrantech's address and the current costs for some of the items covered.

APPENDIX A. DIRECTORY OF LASER DISC PLAYERS

CURRENT LEVEL ZERO PLAYERS

Pioneer Video
LD-660 Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Channel 3 or 4 (switchable)
Impedance:	75 ohms unbalanced

Audio

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	More than 70 dB (CX on, 1KHz 100% mod.)
Frequency Response:	40Hz-20kHz
CX Encoding:	Yes

Interactive Capabilities

Memory:	None
Interface:	None
Access Time:	None

Other Features

Laser:	6328 Angstrom, He-Ne 1 mW
Power:	AC 120V/60Hz
Power Consumption:	85 watts (UL)
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	525x143x395 mm (20$\frac{11}{16}$x5$\frac{5}{8}$x15$\frac{9}{16}$ in)
Weight:	13 kg (28 lb, 10 oz)
Price:	$299

CURRENT LEVEL ONE PLAYERS

Hitachi
VIP-9500 Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	
Impedance:	75 ohms unbalanced

Audio

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	More than 70 dB (CX on, 1KHz 100% mod.)
Frequency Response:	40Hz-20kHz
CX Encoding:	Yes

Interactive Capabilities

Memory:	None
Interface:	RS-232C, Serial, 9600 bps
Access Time:	3 seconds, Instant Jump 180 Fwd., 100 Rev.

Other Features

Laser:	7,800 Angstrom, laser diode, 3 mW
Power:	AC 120V/60Hz
Power Consumption:	45 watts (UL)
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	435x112x424 mm (17$\frac{1}{8}$x4$\frac{3}{8}$x16$\frac{3}{4}$ in)
Weight:	11 kg (24 lb)
Price:	$1,550

Hitachi
VIP-9550 Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	
Impedance:	75 ohms

Audio

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	
S/N Ratio:	More than 70 dB (CX on, 1KHz 100% mod.)
Frequency Response:	40Hz-20kHz
CX Encoding:	Yes

Interactive Capabilities

Memory:	None
Interface:	RS-232C, Serial, 9600 bps
Access Time:	3 seconds, Instant Jump 200 Fwd., 200 Rev.

Other Features

Laser:	7,800 Angstrom, laser diode, 3 mW
Power:	AC 120V/60Hz
Power Consumption:	33 watts (UL)
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	435x115x415 mm (17⅛x4½x16⅜ in)
Weight:	12 kg (26 lb)
Price:	$1,550

Magnavox
VC-8040GY Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Channel 3 or 4 (switchable)
Impedance:	75 ohms unbalanced

Audio

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	More than 75 dB (CX on)
Frequency Response:	40Hz-20kHz
CX Encoding:	Yes

Interactive Capabilities

Memory:	None
Interface:	8 pin DIN connector
Access Time:	10 seconds maximum search time

Other Features

Laser:	7,800 Angstrom, laser diode 3 mW
Power:	AC 120V/60Hz
Power Consumption:	30 watts (UL)
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	420x120x414.8 mm (16½x4¾x16¼ in
Weight:	12.4 kg (27.3 lb)
Price:	$750

Philips
VP-935 Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Optional RF-modulator
Impedance:	

Audio

Output Level:	
Harmonic Distortion:	
S/N Ratio:	
Frequency Response:	
CX Encoding:	Optional

Interactive Capabilities

Memory:	None
Interface:	RS-232C/110-9600 baud with F-command set, optional IEEE 488 parallel control bus
Access Time:	3 seconds, Instant Jump 100 Fwd., 100 Rev.

Other Features

Laser:	
Power:	AC 120V/60Hz, 220V/50Hz, or 240V/50Hz
Power Consumption	
Temperature Range:	
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	535x125x457 mm
Weight:	13 kg
Price:	$1,395

Pioneer Video
LD-700 Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Channel 3 or 4 (switchable)
Impedance:	75 ohms unbalanced

Audio

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	More than 75 dB (CX on)
Frequency Response:	40Hz-20kHz
CX Encoding:	Yes

Interactive Capabilities

Memory:	None

Interface:	8 pin DIN connector
Access Time:	10 seconds maximum search time

Other Features

Laser:	7,800 Angstrom, laser diode, 3 mW
Power:	AC 120V/60Hz
Power Consumption:	30 watts (UL)
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	420x120x414.8 mm (16½x4¾x16¼ in)
Weight:	12.4 kg (27 lb, 5 oz)
Price:	$800

Pioneer Video CLD-900 Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Channel 3 or 4 (switchable)
Impedance:	75 ohms unbalanced

Audio (Analog)

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	76 dB
Frequency Response:	20Hz-20kHz
CX Encoding:	Yes

Audio (Digital)

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.003%
S/N Ratio:	96 dB
Frequency Response:	5Hz-20kHz

Interactive Capabilities

Memory:	None
Interface:	Serial 24 pin and 8 pin DIN connector
Access Time:	

Other Features

Laser:	7,800 Angstrom, laser diode, 3 mW
Power:	AC 120V/50/60Hz
Power Consumption:	45 watts
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV/CD
Dimensions (WxHxD):	420x168x447 mm ($16\frac{9}{16}$x$6\frac{5}{8}$x$17\frac{5}{8}$ in)
Weight:	15.6 kg (34lb, 7oz)
Price:	$1,200

Pioneer Video LD-V4000 Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Channel 3 or 4 (switchable)
Impedance:	75 ohms unbalanced

Audio

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	More than 75 dB (CX on)
Frequency Response:	40Hz-20kHz
CX Encoding:	Yes

Interactive Capabilities

Memory:	None
Interface:	Serial 24 pin and 8 pin DIN connector
Access Time:	6 seconds maximum search time

Other Features

Laser:	7,800 Angstrom, laser diode, 3 mW
Power:	AC 120V/60Hz
Power Consumption:	33 watts (UL)
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	42x12x41.5 cm (16.5x4.7x16.3 in)
Weight:	12.4 kg (27 lb, 5 oz)
Price:	$900

Pioneer Video PR-8210 Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Channel 3 or 4 (switchable)
Impedance:	75 ohms unbalanced

Audio

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	More than 70 dB (CX on)
Frequency Response:	40Hz-20kHz
CX Encoding:	Yes

Interactive Capabilities

Memory:	None
Interface:	Serial Host Computer Port
Access Time:	15 seconds maximum search time

Other Features

Laser:	6,328 Angstrom, He-Ne 1 mW
Power:	AC 120V/60Hz
Power Consumption:	85 watts (UL)
Temperature Range:	+45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	525x143x402 mm ($20\frac{21}{32}$x$5\frac{5}{8}$x$15\frac{13}{16}$ in)
Weight:	13.5 kg (29 lb, 13 oz)
Price:	$499

Sylvania
VP-7400SL Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Channel 3 or 4 (switchable)
Impedance:	75 ohms unbalanced

Audio

Output Level:	650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	More than 75 dB (CX on)
Frequency Response:	40Hz-20kHz
CX Encoding:	Yes

Interactive Capabilities

Memory:	None
Interface:	8 pin DIN connector
Access Time:	10 seconds maximum search time

Other Features

Laser:	7,800 Angstrom, laser diode, 3 mW
Power:	AC 120V/60Hz
Power Consumption:	30 watts (UL)
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	420x120x414.8 mm ($16\frac{1}{2}$x$4\frac{3}{4}$x$16\frac{1}{4}$ in)
Weight:	12.4 kg (27.3 lb)
Price:	$750

CURRENT LEVEL TWO PLAYERS

Sony Video
LDP-1000A Videodisc Player

Video

Video Response:	NTSC specification
S/N Ratio:	More than 42 dB
VHF Output:	Channel 3 or 4 (switchable)
Impedance:	75 ohms unbalanced

Audio

Output Level:	Less than 2K ohms (100% mod., 47K ohm load) unbalanced
Harmonic Distortion:	Less than 0.3% (1kHz 75% mod.)
S/N Ratio:	More than 50 dB
Frequency Response:	40Hz-20kHz
CX Encoding:	No

Interactive Capabilities

Memory:	5K byte programable microprocessor
Interface:	RS-232C connector for EXT CPV
Access Time:	5 seconds maximum search time

Other Features

Laser:	6,328 Angstrom, He-Ne 1 mW
Power:	AC 120V/60Hz
Power Consumption:	110 watts (UL)
Temperature Range:	+5 to +30 degrees C, +45 to +95 degrees F
Disc Format:	CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD):	542x160x415 mm ($21\frac{3}{8}$x$6\frac{1}{4}$x$16\frac{3}{8}$ in)
Weight:	19.6 kg (43 lb, 3oz)
Price:	$2,500

Pioneer Video
LD-V6000 Videodisc Player

Video
Video Response: NTSC specification
S/N Ratio: More than 40 dB
VHF Output: Channel 3 or 4 (switchable)
Impedance: 75 ohms unbalanced

Audio
Output Level: 3.3K ohms
Harmonic Distortion: Less than 0.5% (1kHz 75% mod.)
S/N Ratio: 67 dB with CX, 55 dB without CX
Frequency Response: 20Hz-20kHz
CX Encoding: Yes

Interactive Capabilities
Memory: 7K byte programable microprocessor
Interface: RS-232C built-in interface
Access Time: 3 seconds maximum search time

Other Features
Laser: 7,800 Angstrom, laser diode, 3 mW
Power: AC 120V/50/60Hz
Power Consumption: 40 watts (UL)
Temperature Range: +5 to +30 degrees C, +45 to +95 degrees F
Disc Format: CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD): 420x150x415 mm (16.6x5.9x16.4 in)
Weight: 14 kg (30lb, 13 oz)
Price: $1,490

CURRENT LEVEL THREE PLAYERS

Philips
VP-832 Videodisc Player

Video
Video Response: NTSC specification
S/N Ratio:
VHF Output: Optional RF modulator, channel 3 or 4 (switchable)
Impedance:

Audio
Output Level:
Harmonic Distortion
S/N Ratio:
Frequency Response:
CX Encoding: Optional

Interactive Capabilities
Memory: None
Interface: RS-232C port, optional IEEE 488 port
Access Time: 5 seconds, Instant Jump 250 frames

Other Features
Laser: He-Ne
Power: AC 120V/60Hz, 220V/50Hz, or 240V/50Hz
Power Consumption:
Temperature Range:
Disc Format: CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD): 535x175x410 mm (21x6.9x16.1 in)
Weight: 12 kg (26 lb)
Price: $1,395

Pioneer Video
LD-V1000 Videodisc Player

Video
Video Response: NTSC specification
S/N Ratio: More than 40 dB (CCIR weighted)
VHF Output: Channel 3 or 4 (switchable)
Impedance: 75 ohms unbalanced

Audio
Output Level: 650 mVrms nominal (1kHz 100% mod. 50K ohms terminated)
Harmonic Distortion: Less than 0.5% (1kHz 75% mod.)
S/N Ratio: More than 50 dB
Frequency Response: 40Hz-20kHz
CX Encoding: Yes

Interactive Capabilities
Memory: 512 User Register Locations
Interface: Parallel I/O
Access Time: 3 seconds, Instant Jump 100 frames

Other Features
Laser: 6,328 Angstrom, He-Ne 1 mW
Power: AC 120V/60Hz
Power Consumption: 60 watts (UL)
Temperature Range: +5 to +40 degrees C, +45 to +104 degrees F
Disc Format: CAV/CLV, 12-inch and 8-inch
Dimensions (WxHxD): 52.5x14.3x39.5 cm (20.7x5.6x15.6 in)
Weight: 15 kg (33 lb)
Price: $1,200

APPENDIX B. DIRECTORY OF TELEVISION MONITORS AND TELEVISION PROJECTORS

TELEVISION MONITORS

Electrohome
ECV-25N Television Monitor

Video

Picture Size:	25-inch diagonal
Picture Tube:	
Video Input:	
H. Resolution:	

Audio

Audio Input:	
Audio Output:	10 watts RMS

Other Features

Power:	AC 120V/60Hz
Power Consumption:	
Dimensions (WxHxD):	628x610x583 mm ($24\frac{23}{32}$x24x$22\frac{15}{16}$ in)
Weight:	
Price:	

Mitsubishi
CS-2061R Television Receiver/Monitor

Video

Picture Size:	20-inch diagonal
Picture Tube:	
Video Input:	RGB, NTSC-composite video, or RF
H. Resolution:	320 lines

Audio

Audio Input:	Stereo line in
Audio Output:	Stereo line out (built-in speakers)

Other Features

Power:	AC 120V/60Hz
Power Consumption:	
Dimensions (WxHxD):	20½x19x19¼ in
Weight:	
Price:	$820

NEC
CM-1991A Television Monitor

Video

Picture Size:	19-inch diagonal
Picture Tube:	90 degree reflection
Video Input:	NTSC-composite video, RGB (TTL and linear)
H. Resolution:	350 lines

Audio

Audio Input:	Line in
Audio Output:	5 watts, 8 ohms

Other Features

Power:	AC 120V/60Hz
Power Consumption:	90 watts
Dimensions (WxHxD):	
Weight:	
Price:	$850

Options

SX-S25 speakers
TV Tuner

NEC
C25–900A Television Monitor

Video

Picture Size:	19-inch diagonal
Picture Tube:	90 degree deflection
Video Input:	NTSC-composite video
H. Resolution:	370 lines

Audio

Audio Input:	0.4Vrms, high impedance, unbalanced
Audio Output:	7 watts per channel, 8 ohms

Other

Power:	AC 120V/60Hz
Power Consumption:	130 watts
Dimensions (WxHxD):	668x592x519 mm (26½x23⅜x20½ in)
Weight:	42 kg (92.4 lbs)
Price:	$850

Options

NS-2600 Speaker System
TU-820EN TV Tuner

NEC
CM-2591A Television Monitor

Video

Picture Size:	25-inch diagonal
Picture Tube:	100 degree deflection
Video Input:	NTSC-composite video, RGB (TTL or linear)
H. Resolution:	350 lines

Audio

Audio Input:	Line level
Audio Output:	5 watts, 8 ohms

Other Features

Power:	AC 120V/60Hz
Power Consumption:	125 watts
Dimensions (WxHxD):	
Weight:	
Price:	$1,100

Options

Speaker System
TV Tuner

Sony
KX-1901 Television Monitor

Video

Picture Size:	19-inch diagonal
Picture Tube:	Trinitron, 100 degree deflection
Video Input:	NTSC-composite video, RGB
H. Resolution:	

Audio

Audio Input:	-5 dB (436 mVrms), 47K ohms
Audio Output:	5 watts, 8 or 16 ohms

Other Features

Power:	AC 120V/60Hz
Power Consumption:	93 watts
Dimensions (WxHxD):	504x452x480 mm (19⅞x17⅞x19 in)
Weight:	33 kg (72 lb, 12 oz)
Price:	$720

Options

VTX-1000R TV Tuner
RM-705 Remote Control
SS-X1A Speaker System ($70)
SS-X10A Speaker System ($115)

Sony
KX-2501 Television Monitor

Video

Picture Size:	25-inch diagonal
Picture Tube:	Trinitron, 114 degree deflection
Video Input:	NTSC-composite video, RGB
H. Resolution:	

Audio

Audio Input:	-5 dB (436 mVrms) 47K ohms
Audio Output:	5 watts, 8 or 16 ohms

Other Features

Power:	AC 120V/60Hz
Power Consumption:	132 watts
Dimensions (WxHxD):	660x560x487 mm (26x22⅛x191/4 in)
Weight:	55 kg (121 lb, 4 oz)
Price:	$1,090

Options

VTX-1000R TV Tuner
RM-705 Remote Control
SS-X1A Speaker System ($70)
SS-X10A Speaker System ($115)

Sony
PVM-1271Q Television Monitor

Video

Picture Size:	12-inch diagonal
Picture Tube:	Trinitron, 0.25 mm RGB phosphor-stripe pitch
Video Input:	NTSC-composite video, RGB, PAL, SECAM
H. Resolution:	500 lines (video), 600 lines (RGB)

Audio

Audio Input:	Line level
Audio Output:	

Other Features

Power:	AC 120V/60Hz
Power Consumption:	
Dimensions (WxHxD):	13½x13 13/16x15 3/16 in
Weight:	32 lb, 2 oz
Price:	$915

Sony
PVM-1910 Television Monitor

Video

Picture Size:	19-inch diagonal
Picture Tube:	Trinitron
Video Input:	NTSC-composite video, analog/digital RGB
H. Resolution:	

Audio

Audio Input:	
Audio Output:	

Other Features

Power:	AC 120V/60Hz
Power Consumption:	
Dimensions (WxHxD):	19¼x18¼x21¼ in
Weight:	63 lb, 15 oz
Price:	$730

Videotek Inc.
RM-19 Television Monitor

Video

Picture Size:	19-inch diagonal
Picture Tube:	Trinitron Plus
Video Input:	NTSC-composite video
H. Resolution:	

Audio

Audio Input:	Line level
Audio Output:	8 ohms

Other Features

Power:	AC 120V/60Hz
Power Consumption:	
Dimensions (WxHxD):	24⅝x18¼x15⅝ in
Weight:	75 lb
Price:	$930

Videotek Inc
RM-21 Television Monitor

Video

Picture Size:	21-inch diagonal
Picture Tube:	Trinitron Plus
Video Input:	NTSC-composite video
H. Resolution:	

Audio

Audio Input:	Line level
Audio Output:	8 ohms

Other Features

Power:	AC 120V/60Hz
Power Consumption:	
Dimensions (WxHxD):	27⅝x20⅛x16¼ in
Weight:	82 lb
Price:	$1,120

SELF-CONTAINED TELEVISION PROJECTORS

Hitachi
CT5011 Projection Television

Video

Picture Size:	50-inch diagonal
Picture Type:	Front projection console
Video Input:	RF, NTSC-composite video
Brightness:	120 ft lamberts

Audio

Audio Input:	Line level
Audio Output:	20 watts stereo, built-in speakers

Other Features

Power:	AC 120V/60Hz
Power Consumption:	121 watts
Dimensions (WxHxD):	31¼x62½x42¾ in (open)
Weight:	
Price:	$1,500

NEC
PJ-4000EN Projection Television

Video

Picture Size:	40-inch diagonal
Picture Type:	Rear projection console, 5-inch refractive CRT
Video Input:	VHF, 75 ohms unbalanced, NTSC-composite video
Brightness:	150 ft lamberts at center

Audio

Audio Input:	Line level
Audio Output:	20 watts, built-in speakers

Other Features

Power:	AC 120V/60Hz
Power Consumption:	
Dimensions (WxHxD):	940x1240x560 mm (37x48$\frac{13}{16}$x22 in)
Weight:	
Price:	$2,800

Sony
RVP-460 Projection Television

Video

Picture Size:	46-inch diagonal
Picture Type:	Rear projection console
Video Input:	RF, NTSC-composite, RGB (analog or digital)
Brightness:	

Audio

Audio Input:	Line level
Audio Output:	10 watts stereo (built-in speakers)

Other Features

Power:	AC 120V/60Hz
Power Consumption:	
Dimensions (WxHxD):	41¾x45¾x24⅝ in
Weight:	229 lb, 5 oz
Price:	$4,400

Option

Modular Base

MOUNTABLE TELEVISION PROJECTORS

Electrohome (U.S.A.) Limited
ECP 1000 Television Projection System

Optical

Projection System:	3-Tube, 3-Lens, Front or Rear Screen
Picture Tube:	
Projection Lens:	Single lens, dichroic design
Picture Size:	5 ft to 7 ft diagonal
Picture Brightness:	130 ft lamberts (6-ft image 10 gain)
Throwing Distance:	87.5 in

General

Video Format:	NTSC
RGB Resolution:	
Video Resolution:	600 lines
Horizontal Scan:	15kHz to 33kHz
Vertical Scan:	45Hz to 100Hz
Power Requirements:	AC 90V-132V or 180V-264V, 50/60Hz
Power Consumption:	250 watts
Dimensions (HxWxD):	254x956x651 mm (10x37.63x25.63 in)
Weight:	75 lb
Price:	$14,000

Electronic Systems Products, Inc.
Aquaray Television Projection System

Optical

Projection System:	3 Tube, 3 Lens Front Screen
Picture Tube:	3 Cathode Ray Tubes, 35KV at 1 ma each
Projection Lens:	f1.0 Refractive Lenses
Picture Size:	4 ft to 25 ft wide
Picture Brightness:	
Throwing Distance:	1.5 times screen width (6-ft image = 9-ft throw)

General

Video Format:	NTSC composite video
RGB Resolution:	N/A
Video Resolution:	330 lines
Horizontal Scan:	
Vertical Scan:	
Power Requirements:	AC 115V/60Hz, 220V/50Hz
Power Consumption:	300 watts
Dimensions (HxWxD):	7.5x21x24.5 in
Weight:	49 lb
Price:	

Options

High-resolution coated lenses

Lenses for smaller than 4-ft images

Ceiling mounts

Electronic Systems Products, Inc.
Aquastar IIIC Television Projection System

Optical

Projection System:	3 Tube, 3 Lens Front or Rear Screen
Picture Tube:	3 Cathode Ray Tubes, 36KV at 1 ma each
Projection Lens:	High-resolution, coated f1.0 lenses
Picture Size:	4 ft to 20 ft wide
Picture Brightness	
Throwing Distance:	1.5 times screen width (6-ft image = 9-ft throw)

General

Video Format:	PAL, SECAM, NTSC composite video
RGB Resolution:	800 lines
Video Resolution:	330 lines
Horizontal Scan:	15kHz to 37kHz
Vertical Scan:	40Hz to 120Hz
Power Requirements:	AC 115V/60Hz, 220V/50Hz

Power Consumption:	400 watts
Dimensions (HxWxD):	22x51x72 cm (9.5x20x28.5 in)
Weight:	33.7 kg (75 lb)
Price:	$13,995

Options
Lenses for smaller or larger images
Ceiling Mounts

General Electric Company
Talaria PJ4500 Television Projectors

Optical

Projection System:	Single-gun single-path system
Picture Tube:	Single optical path light valve
Projection Lens:	86 mm lens, less than 1.5% distortion
Picture Size:	4 ft to greater than 24 ft
Picture Brightness:	325 lumens
Throwing Distance:	5 ft to 200 ft

General

Video Format:	NTSC or RGB
RGB Resolution:	625 lines, 50 fps
Video Resolution:	525 lines, 60 fps
Horizontal Scan:	
Vertical Scan:	
Power Requirements:	105 to 132v or 190 to 260v 50/60 Hz
Power Consumption:	900 watts maximum
Dimensions (HxWxD):	22x17x34 in
Weight:	145 lb
Price:	$35,000

General Electric Company
Talaria PJ5050 Television Projectors

Optical

Projection System:	Single-gun single-path system
Picture Tube:	Single optical path light valve
Projection Lens:	86 mm lens, less than 1.5% distortion
Picture Size:	4 ft to greater than 24 ft
Picture Brightness:	650 lumens
Throwing Distance:	5 ft to 200 ft

General

Video Format:	NTSC or RGB
RGB Resolution:	625 lines, 50 fps
Video Resolution:	525 lines, 60 fps
Horizontal Scan:	
Vertical Scan:	
Power Requirements:	105 to 132v or 190 to 260v 50/60 Hz
Power Consumption:	900 watts maximum
Dimensions (HxWxD):	22x17x34 in
Weight:	145 lb
Price:	$79,000

General Electric Company
Talaria PJ5055 Television Projectors

Optical

Projection System:	Single-gun single-path system
Picture Tube:	Single optical path light valve
Projection Lens:	86 mm lens, less than 1.5% distortion
Picture Size:	4 ft to greater than 24 ft
Picture Brightness:	1300 lumens
Throwing Distance:	5 ft to 200 ft

General

Video Format:	NTSC or RGB
RGB Resolution:	625 lines, 50 fps
Video Resolution:	525 lines, 60 fps
Horizontal Scan:	
Vertical Scan:	
Power Requirements:	105 to 132v or 190 to 260v 50/60 Hz
Power Consumption:	900 watts maximum
Dimensions (HxWxD):	22x17x34 in
Weight:	145 lb
Price:	$90,000

Inflight Services, Inc.
V Star 4C Television Projection System

Optical

Projection System:	3 Tube, 3 Lens Front or Rear Screen
Picture Tube:	5" High-resolution projection tubes
Projection Lens:	Delta-2D, f1.0 coated, color-corrected
Picture Size:	50 in to 20 ft diagonally
Picture Brightness:	480 ft lamberts (10 gain screen)
Throwing Distance:	1.5 times screen width

General

Video Format:	PAL, SECAM, NTSC 3.58, NTSC 4.43
RGB Resolution:	625 lines, 50 field, 10mHz full drive
Video Resolution:	525 lines, 60 field
Horizontal Scan:	14kHz to 32kHz
Vertical Scan:	45Hz to 100Hz
Power Requirements:	AC 110V/220V, 50Hz to 900Hz

Power Consumption:	200 watts
Dimensions (HxWxD):	9¼x22¼x29¼ in
Weight:	70 lb
Price:	$14,495

Inflight Services, Inc.
V Star 4 Television Projection System

Optical

Projection System:	3 Tube, 3 Lens Front or Rear Screen
Picture Tube:	5" High-resolution projection tubes
Projection Lens:	f1.0 coated lenses
Picture Size:	50 in to 20 ft diagonally
Picture Brightness:	480 ft lamberts (10 gain screen)
Throwing Distance:	1.5 times screen width

General

Video Format:	PAL, SECAM, NTSC 3.58, NTSC 4.43
RGB Resolution:	625 lines, 50 field, 10mHz full drive
Video Resolution:	525 lines, 60 field
Horizontal Scan:	
Vertical Scan:	
Power Requirements:	AC 110V/220V, 50Hz to 900Hz
Power Consumption:	200 watts
Dimensions (HxWxD):	9¼x22¼x29¼ in
Weight:	70 lb
Price:	$7,900

Sony Video Communications Company
VidMagic FP-60 Television Projection System

Optical

Projection System:	Single Lens Front Screen system
Picture Tube:	5.25" high-brightness color tube
Projection Lens:	Acrylic lense f1.0/130 mm
Picture Size:	30 to 200 in diagonally
Picture Brightness:	50 ft lamberts with 19 gain 55" screen
Throwing Distance:	Approx. 1.1 m (3.7 ft) with 30 in screen Approx. 2 m (6.7 ft) with 55 in screen Approx. 3.8 m (12.7 ft) with 100 in screen

General

Video Format:	NTSC-composite video, VHF/UHF
Video Resolution:	240 lines
Horizontal Scan:	
Vertical Scan:	
Audio:	Built-in 3 watt public address system
Power Requirements:	AC 120V/60Hz
Power Consumption:	110 watts
Dimensions (HxWxD):	246x220x668 mm (9¾x8¾x26¾ in)
Weight:	14 kg (30 lb, 14 oz)
Price:	$2,150 for basic system $2,995 with built-in Betamax system

Options

RM-27 remote control unit with microphone

VLC-60 projector carrying bag

Sony Video Communications Company
VPH-1020Q Television Projection System

Optical

Projection System:	3 Tube, 3 Lens Front Screen system
Picture Tube:	5.5 in high-brightness monochrome tubes
Projection Lens:	Acrylic lenses f1.0/130 mm
Picture Size:	100 in diagonally
Picture Brightness:	More than 65 ft lamberts
Throwing Distance:	Approx. 3,368 mm (132.75 in)

General

Video Format:	PAL, SECAM, NTSC, NTSC 4.43
RGB Resolution:	600 lines, 2000 characters
Video Resolution:	400 lines
Horizontal Scan:	15.75kHz
Vertical Scan:	60Hz
Power Requirements:	AC 110V/240V, 50Hz/60Hz
Power Consumption:	165 watts
Dimensions (HxWxD):	10.25x20x23.63 in
Weight:	26 kg (57 lb., 5 oz)
Price:	$5,850

Options

VPR-722 remote controller

SV-722 projector pedestal

VPS-F100 video screen ($720)

VPS-100HG1 video screen ($500)

PSS-722 ceiling mount

Sony Video Communications Company
VPH-722Q Television Projection System

Optical

Projection System:	3 Tube, 3 Lens Front Screen system
Picture Tube:	5.5 in. high-brightness monochrome tube
Projection Lens:	Acrylic lenses, f1.0/130 mm
Picture Size:	72 in diagonally
Picture Brightness:	130 ft lamberts (13 gain screen)
Throwing Distance:	Approximately 2,480 mm (97.75 in.)

General

Video Format:	PAL, SECAM, NTSC, NTSC 4.43
RGB Resolution:	600 lines, 2000 characters
Video Resolution:	400 lines
Horizontal Scan:	15.75kHz
Vertical Scan:	60Hz
Power Requirements:	AC 120V/50Hz/60Hz
Power Consumption:	165 watts
Dimensions (HxWxD):	10.25x20x23.63 in
Weight:	26 kg (57 lb, 5 oz)
Price:	$5,850

Options

VPR-722 remote controller
SV-722 projector pedestal
VPS-F100 video screen ($720)
VPS-100HG1 video screen ($500)
PSS-722 ceiling mount

APPENDIX C. DIRECTORY OF LASER DISC INTERFACES

Allen Communication
UVC (Universal Video Controller)

This unit is an intelligent, self-contained interface that links virtually any computer with multiple videodisc and videotape players.

Features
- Controls up to two disc players and two tape players
- 1K RAM buffer
- Z80 microprocessor, 2.5 Mz
- RS-232C connectors
- Auto baud rate detection from 150 to 19,200 bps
- Accepts four audio sources, switches two channels out
- Accepts three video sources, switches one channel out
- Supports overlay of synchronized video
- Custom cables and demo disc/tape provided

Price: $1,200

Allen Communications
VMI (Videodisc-Microcomputer Interface)

This unit will interface an Apple II computer with any of the disc players currently on the market.

Features
- Can use either Apple Pascal or BASIC formats
- Multiple boards in one computer can run several videodisc players
- Standard RS-232C connections
- Baud rates: 150, 300, 600, 1200, 2400, 4800, and 9600 bps
- Software can switch audio and video between monitor or computer input
- Cables and demo disc provided

Price: $575

Options
- Enhanced Super Pilot authoring software
- Microkeyer video overlay board
- Software and cables for additional players

Allen Communications
MVP (Most Valuable Peripheral) Interface

Features
- Compatible with Apple II+, IIe, IIc, Commodore 64, Atari, and other micros in progress
- Supports Pioneer VP-1000, PR-8210, LD-V700, LD-V4000, Magnavox 8010, and Sylvania 7200 players
- Can use Pascal, BASIC or Super Pilot programs
- Software command menu provides exercise of all commands through single keystrokes
- Software can switch audio and video between monitor or computer input
- Cables and demo disc provided

Price: $149.95

Anthro-Digital
Omniscan Laser Videodisc Interface

Features
- Single screen switching
- For use with Apple II or IIe computers
- Compatible with the following laser disc players: Pioneer VP-1000, LD-1100, and PR-8210; Sylvania VP-7200; and Magnavox VC-8010GY
- Complete with necessary cables
- Documentation and tutorial provided
- Software included in Applesoft, BASIC, Machine Language, Apple UCSD Pascal, and Super Pilot

Price: $250

Options
- Wireless control ($30)
- Pascal and Super Pilot drivers ($25)

BCD Associates
VIPc IBM-PC Videotape/Videodisc Controller

Features
- Contains internal microprocessor
- Simple user commands can access all videodisc functions
- Compatible with all current disc players except Hitachi, Philips, and Pioneer LD-V6000
- Compatible with IBM-PC, Compaq, Columbia, Corona, and other similar computers
- Plug-in board comes with up to two modules for disc, tape, or one of each

- Supports use of Microkey graphics overlay system

Price: $1,195.

Options
- Board with combination of any two modules tape or disc ($1,695)
- Microkey overlay system for IBM ($2,800)

Bell & Howell
Videodisc Interface Card

Features
- For use with Apple II+ or IIe computers
- Compatible with Sony LDP-1000 laser disc player
- Compatible with PASS authoring system
- Capable of sound over computer generated graphics
- Single screen switching
- 5 ft analog cable
- 5 ft control signal cable
- Supported by Bell & Howell AVA system software

Price: $600

Delex Systems, Inc.
Discmate 1.5 Controller and Still Frame Audio Unit

The Discmate 1.5 works as a videodisc controller by using audio codes placed on an audiocassette player. One track of the audio can be used for narration or instructions while the other track contains disc controlling information.

Features
- Audio information can be updated easily and quickly
- Full function capabilities, stop, play, slow forward or reverse, frame or chapter search.
- Works with low-cost videodisc players with serial computer port
- Can be easily modified for use with any videodisc player
- Uses an ordinary stereo audiocassette recorder

Price: $450

Destron, Inc.
Videodisc Switcher Interface

Features
- Compatible with any player with an RS-232 buss slot
- Controls two disc players and three video sources
- Software drivers in Applesoft BASIC, Pascal, and CP/M
- Controls all player functions
- For use with Apple computers
- Grahpics overlay capabilities

Price: $650

Digital Controls
Red Card Interface

Features
- For use with Apple II computers
- Single monitor screen switching
- No modifications required
- All cables, connectors, software, and documentation provided
- 6809 CPU
- Baud rate switchable: 19,200 to 150
- Serial RS-232C, parallel IEEE-488
- Software-controlled DPDT relay video switcher
- 4K ROM, 2K RAM
- Compatible with Pioneer PR-7820 and Sony LDP-1000

Price: $500

Digital Controls
Red Max Interface

Features
- For use with any RS-232 equipped microcomputer
- Single monitor screen switching from two video sources and computer video signal
- No modifications required
- Onboard power supply
- All cables, connectors, software, and documentation provided
- 6809 CPU
- Baud rate switchable: 9600 to 300
- Serial RS-232C, parallel 24 pin IEEE-488
- Software-controlled DPDT relay video switcher
- 8/16K ROM, 2K RAM
- Compatible laser disc players: Pioneer PR-7820, PR-8210; Sony LDP-1000
- Compatible tape players: Sony ½-inch Beta SLO-323, Panasonic ½-inch NV-820
- Microprocessor-based command processing

Price: $550

IEV Corporation
IEV-40 IBM-PC Overlay and Disc Controller Board

Features
- Overlay RGB onto NTSC composite video

- Can drive NTSC or RGB color monitors
- Genlock sync generator syncs to videodisc or videotape players
- Control features for videodisc or videotape players
- Available with RS-232 (IEV-40A) or programable parallel port control (IEV-40B)
- Compatible with IBM-PC or XT
- Single screen switching
- Choice of several optional graphics boards that are compatible with most standard IBM software programs

Price: $550

Options
- IEV-10A color graphics board ($450)
- IEV-20A high-resolution color graphics board 640x408x16 ($995)
- IEV-20B high-resolution color graphics board 640x408x16 with palette of 4096 and onboard Motorola 68000 32-bit micro ($1,395)
- IEV-30 very high resolution color graphics card available soon ($2,000 est.)

IEV Corporation
IEV-60 Disc Controller System with Graphic Overlay

Features
- Overlay RGB onto NTSC composite video
- Can drive NTSC or RGB color monitors
- Genlock sync generator syncs to videodisc or videotape players
- Control features for videodisc or videotape players
- Contains onboard Motorola 68000 32-bit microprocessor with memory to run user programs
- Requires no additional microcomputer
- Parallel or serial ports allow compatability with most current microprocessors
- Graphics resolution of 640x408x16 from a palette of 4096
- Single screen switching
- Text and special characters of different styles and sizes
- Graphics commands for picture creation
- Controlled by most higher-level languages, including Pascal, BASIC, FORTRAN, and COBOL

Price: to be announced

Interactive Training Systems
ITS-3000 Interface Controller

Features
- For use with IBM-PC computers
- Works with Beta or VHS videotape and laser disc players
- Converts NTSC video to RGB video
- Supports earphone attachment
- RS-232C connections
- Single screen switching
- Graphic overlay capabilities
- Time code reader and regenerator
- 1200 baud interface, 8 bit ASCII with 2 stop bits
- Dimensions (HxWxD) 3.5x18.75x14.25 in

Price: $2,995

JAM Incorporated
JAM Card Videodisc Interface

Features
- For use with IBM-PC computers
- Single screen switching
- Serial or parallel capabilities
- Compatible with the following players: Pioneer LD-V1000, 7820–3, and 8210; Sony LDP-1000 and 1000A; and Hitachi 8500 and 9500
- Software support drivers included
- One set of specified cables included

Price: $395

New Media Graphics
Disc Master 1000 Videodisc Interface

Features
- For use with RS-232 equipped microcomputers
- Baud rate switchable 9600 to 300
- Word length 8 bits data, 1 bit stop
- Dimensions (HxWxD) 5x5¼x1½ in, weight 1.5 lb
- 25 pin, male DB25 type for RS-232C connections
- Compatible players: Pioneer VP-1000, LD-1000, PR-8210, and PR-7820; Magnavox VC-8010GY; and Sylvania VP-7200

Price: $90

Online Computer Systems
VDC-100 Videodisc Controller Board

Features
- For use with IBM-PC computers
- Includes touch panel interface for Sony PVM-1271Q
- Allows multiple controllers within one PC
- Controls any interactive laser disc player

- Includes cables for specified configuration
- Any cable configuration is optionally available

Price: $350

Options
- Second set of cables ($75)
- PilotPlus ($1,000)
- Pascal MT+ library ($100)
- C library ($100)

Online Computer Systems, Inc.
GL-512 Videodisc Controller with Overlay

Features
- High resolution graphics 512x480 pixels
- 16 colors from a palette of 4096
- Hardware pan and zoom (256x240x16 color resolution)
- Video images can be overlayed with position-dependent graphics
- Multiple card options for one PC to control multiple displays and disc players
- All interface hardware included to run disc player and peripherals
- Controls most laser videodisc players
- Broadcast quality RGB color graphics

Price: $1,500

Options
- Pascal MT+ library ($150)
- C library ($150)
- PilotPlus ($1,000)
- Studio-PC graphics ($1,200)

Pioneer Video
SIA IU-03 Serial Interface Adapter

This device is a communications adapter that connects RS-232 compatible microcomputers with the Pioneer LD-V1000 videodisc player.

Features
- Can act as stand-alone controller for the LD-V1000 with user-supplied EPROM
- Supports player output protocol
- Three command formats available including ASCII mnemonic format
- 400 byte RAM input buffer
- 600 byte RAM output buffer

Price: $300

Symtec
DVA Videodisc Control Card

Features
- Plugs into single APPLE peripheral slot
- 8-bit parallel bidirectional communication
- Software supports 7820–2 and 7820–3 players
- Single screen switching
- Software on DOS 3.3 disc
- 75 ohm video inputs
- 75 ohm video outputs
- Software accessible from BASIC programs

Price: $350

Symtec
Sony Videodisc Control Card

Features
- Plugs into single Apple peripheral slot
- RS-232 serial interface, bidirectional
- Single screen switching
- Software on DOS 3.3 disc
- Two 75 ohm video inputs
- 75 ohm video output
- Software acessible from BASIC programs

Price: $350

Video Vision Associates
VAI-II Videodisc/Apple Interface

Features
- For use wiith Apple II or IIe computers
- Software based controller connects to game paddle port
- No modifications necessary
- Operates with the following laser disc players: Pioneer VP-1000, LD-1100, and PR-8210; Magnavox VC-8010GY; and Sylvania VP-7200
- Includes software, sample programs, and cables
- Single screen switching

Price: $140

Options
- IN04 Interface cable for LD-700 ($15)
- IN05 Interface cable for LD-V4000 ($15)

Video Vision Associates
ATVI Audiotape/Videodisc Interface

Features
- No computer needed

- Videodisc control commands are on audiotape
- Voice or music can be used on second audio track
- Filmstrip style programs are easily programed
- Compatible with the following laser disc players: Pioneer VP-1000, PR-8210, DVA-7820, and LD-1100; Magnavox VC-8010GY; and Sylvania VP-7200

Price: $125

Visage, Inc.
V:LINK 1000 Videodisc Interface with Overlay

Features
- Uses one expansion slot on IBM-PC with 256K (512K and two disc drives needed for development)
- Universal videodisc control interfaces most current players
- Includes NTSC graphics generation and overlay capabilities
- Real-time data decoding from the videodisc
- Includes operating software, graphics development software, and package of useful graphics elements
- 256x192 pixel resolution with 16 colors
- Open architecture allows for third party software in development and delivery
- Internal sync for independent operation

Price: $1,150

Options
- V:Link bit pad package (BPD-1000) ($850)
- Videodisc interface cables (specify disc player) ($35 to $75)

Visage, Inc.
V:LINK 1500 Videodisc Interface with Overlay

Features
- Uses two expansion slots on IBM-PC with 256K (512K and two disc drives needed for development)
- Universal videodisc control interfaces most current players
- Includes RGB graphics generation and overlay capabilities
- Real-time data decoding from the videodisc
- Includes operating software, graphics development software, and package of useful graphics elements
- 256x192 pixel resolution with 16 colors
- Open architecture allows for third party software in development and delivery
- Internal sync for independent operation

Price: $1,850

Options
- V:Link bit pad package (BPD-1000) ($850)
- Videodisc interface cables (specify disc player) ($35 to $75)

Visage, Inc.
V:LINK 1550 Videodisc Interface with Overlay

Features
- Uses two expansion slots on IBM-PC with 256K (512K and two disc drives needed for development)
- Universal videodisc control interfaces most current players
- Includes RGB graphics generation and overlay capabilities
- Real-time data decoding from the videodisc
- Includes operating software, graphics development software, and package of useful graphics elements
- 256x192 pixel resolution with 16 colors
- 300x200 pixel resolution with 4 colors
- Open architecture allows for third party software in development and delivery
- Internal sync for independent operation

Price: $2,150

Options
- V:Link bit pad package (BPD-1000) ($850)
- Videodisc interface cables (specify disc player) ($35 to $75)

Visual Database Systems
PC/LD Videodisc Interface

Features
- Includes cable and software driver
- For use with IBM-PC, PCjr, or XT computers
- For use with Pioneer LD-700, LD-V4000, and LD-V6000 disc players
- Software is capable of issuing entire command set to disc player
- Can be connected to the cassette or parallel port
- Can control up to four videodisc players

Prices:
$65 for parallel port version
$95 for cassette port version

Whitney Educational Services
A1320 Videodisc/Audio Interface

Features
- Two-screen system

- Controls videodisc player with audio tones on videotape
- Real-time video on tape can be augmented with slides from disc
- Both players can display video simultaneously
- Compatible with Apple computers

Price: $100

Options
- PC1320 interface for IBM-PC ($100)
- SM1320 interface for Sony SMC-70 ($100)

Whitney Educational Services
PC-500-A IBM-PC Disc/Tape Controller

Features
- For use with IBM-PC or XT computers
- Operates videotape and disc players together or separately
- Can be used with Insight 2000 Plus authoring language
- Compatible with Pioneer LD-V4000 and PR-8210, Hitachi 9500, and Sony LDP-1000A players

Price: $990

Whitney Educational Services
SM-500-A SMC-70 Disc/Tape Controller

Features
- For use with Sony SMC-70, 70G computers
- Operates videotape and disc players together or separately
- Can be used with Insight 2000 Plus authoring language
- Compatible with Pioneer LD-V4000 and PR-8210, Hitachi 9500, and Sony LDP-1000A players

Price: $895

Whitney Educational Services
A3001A Apple Disc/Tape Controller

Features
- For use with Apple II and IIe computers
- Operates videotape and disc players together or separately
- Can be used with Insight 2000 Plus authoring language
- Compatible with Pioneer LD-V4000 and PR-8210, Hitachi 9500, and Sony LDP-1000A players

Price: $695

APPENDIX D. DIRECTORY OF LASER DISC PERIPHERALS

GRAPHIC OVERLAY DEVICES

New Media Graphics
Graph Over 9500 Graphics Overlay Interface

Features

- Motorola 6809 display processor with 32K RAM and ROM
- NEC 7220 graphics generator
- 768x682 pixel display buffer, 4 bits/pixel
- 768x484 pixel viewable window, 4 bits/pixel
- Up to eight standard ASCII character set fonts (upper and lower)
- Additional character fonts are programable and definable with resolution up to 16x24 pixels/character
- Single pixel vertical increment pan feature, and 16 pixel increments horizontally, split-screen has independent pan
- 2x to 16x selectable magnification zoom feature
- RGB output: RS-170 compatible 1 Vp-p 75 ohms, composite sync and blanking on all outputs, 30Hz interlaced video, 15.734kHz horizontal scan frequency
- NTSC output: Broadcast quality RS-170 1 Vp-p 75 ohms composite sync and blanking, 30Hz interlaced video
- RS-170 compatible Genlock circuit, 1 Vp-p 75 ohms with 3.579545 mHz subcarrier, switches to internal oscillator in absence of external video
- Video switching between two NTSC video inputs
- Audio switching between four audio inputs
- RS-232C asyncronous interface to host CPU serial port
- Baud rate selectable 300 to 19.2K baud (DB-25)
- High-speed parallel interface to host CPU or for control of videodisc players and VTRs, two 8-bit Centronics compatible links, one for input and one for output
- Three 9-pin RS-232 compatible links for interactive device or up to two videodisc players
- Dimensions (HxWxD) 5½x19x25 in
- Weight 30 lb
- 110 VAC, 60Hz, 100 watts

Price: $9,850

Options

- Graphics tablet, 11x11 in active area, electromagnetic type ($1,450)
- Joystick, rate type with X,Y,Z output ($1,450)

Online Computer Systems, Inc.
GL-512 Graphic Overlay Card

Features

- High-resolution graphics 512x480 pixels
- 16 colors from a palette of 4096
- Hardware pan and zoom (256x240x16 color resolution)
- Video images can be overlayed with position dependent graphics
- Multiple card options for one PC to control multiple displays and disc players
- Broadcast quality RGB color graphics

Price: $1,500

Options

- Pascal MT+ library ($150)
- C library ($150)
- PilotPlus ($1,000)
- Studio-PC graphics ($1,200)

Symtec
Professional Graphics System (PGSIII)

Features

- 16K or 64K dynamic RAM chips
- 512x480 pixel resolution
- 4096 colors
- Crawl or roll text
- Center by line or page
- Flash words
- Allows font creation
- Built-in keyer with drop shadow and border
- Mixed fonts and colors
- Saves images on floppy disc
- Preview capability
- Random pixel access
- Computer interface to Apple II+ or IBM-PC
- Broadcast quality, NTSC standard
- Video overlay capabilities
- Adjustable hue, chrominance, luminance, blank, and sync
- Dimensions (HxWxD) 17x5½x13 in
- 75 ohm high-impedance switchable video output
- Horizontal sync adjustment for proper phasing
- Internal or external sync
- Zoom and reduce features

Price: $7,000

Options
- PGS III 2-page system ($8,500)
- PGS II 2-page system with preview ($10,000)

Synetix, Inc.
Videosprite Graphics Overlay System

Features
- Requires Apple II series micro with 48K memory, one disc drive and DOS 3.3 operating system with two monitors (one for programing input and one for video output)
- Large range of computer graphics capabilities
- Easy to use command language
- Commands can be abbreviated
- Background resolution of 256x192 pixels
- Standard text mode with 40 columns by 32 rows
- 14 selectable colors and black
- Video output retains standard of video input
- 16K of dedicated video RAM on board
- Incoming video can be interlaced or noninterlaced
- Signal is phase and frequency locked to color burst, horizontal and vertical signals of video source
- Includes Painting and Titling software (P.A.T.) and system documentation

Price: $995

Options
- Flashcard 144K (RAM disk emulator) ($395)
- Flashcard 288K (RAM disk emulator) ($595)
- Complete system (includes Videosprite board, P.A.T. software, Flashcard 288K, and Apple IIe starter system with documentation) ($3,695)

Video Associates Labs
VB-3 Microkey System for Graphics Overlay

Options
- NTSC standard composite video signal, 75 ohm self-terminated
- Normal resolution; 280 pixels per line; 192 lines; 53,760 pixels per picture; 140 nanosecond width
- Full screen resolution; 360 pixels per line; 240 lines; 86,400 pixels per picture; 140 nanosecond width
- Works with VTRs and videodiscs without a TBC
- Operates without a video input
- Genlock sync generator locks to external sources
- Proc amp regenerates burst and sync
- Full screen color background matte
- Broadcast NTSC keyed video output
- Includes power supply

Prices:
$2,800 for VB-3EM Microkeyer for Apple IIe
$2,600 for VB-3E Microkeyer for Apple IIe
$2,400 for VB-3 Microkeyer for Apple II/II+

Options
- TazSoft slate/character generator ($350)
- LPS II light pen ($349)

Video Associates Labs
PC-Microkey System for Graphics Overlay

Standard Features
- Fully IBM-PC compatible
- Will work with off-the-shelf software
- Operates with IBM, Plantronics, or Tecmar color graphics cards
- Includes videodisc controller

Model 1100
- For use with videodisc players with external sync
- Requires RGB monitors (Sony KX series or equivalent)

Model 1150
- Includes all features of Model 1100
- Includes serial port for controlling other disc players

Model 1300
- For use with most video sources
- Broadcastable and recordable NTSC composite video output
- Built-in parallel port to control Pioneer LD-V1000

Prices:
$995 for Model 1100
$1,095 for Model 1150
$1,805 for Model 1300

Options
- IBM color graphics card (320x200x4 from a palette of 16 colors) ($275)
- Plantronics Colorplus graphics card (640x200x16 from a palette of 256 colors) ($475)
- Tecmar Graphics Master card (640x400x16 from a palette of 256 colors) ($695)
- Koala Pad ($150)

TOUCH SCREENS

Carroll Touch Technology Corporation
Touch Screens

The Carroll Touch Technology Corporation has a wide range of touch screens available for the monitors and terminals commonly used in the computer field. The prices range between $1,900 and $2,500. Contact Carroll for information on specific monitors.

13-inch Monitors
- Aydin 8039, 8810
- Mitsubishi C3419
- Ramtek GM714
- Sanyo DMC6013
- Sony PVM-1271Q

19-inch Monitors
- Aydin 8025, 8026, 8040, 8830
- Ikagami DM511H
- Mitsubishi C3910, C3919 C6912, C6919
- Ramtek GM719, GM720, 859C

Terminals
- Hewlett-Packard 264X series, DEC VT100TM and VT103TM, Datamedia Excel 22, ● Excel 24 and Colorscan, and ISC8001G

Flat Touch Panels
- 9x9 inch window ($1,800)
- 17x17 inch window ($2,900)

Generic Kits
All Prices include $600 controller:
- 9 in diagonal frame ($1,600)
- 12 in diagonal frame ($1,800)
- 15 in diagonal frame ($2,000)
- 17 in diagonal frame ($2,200)
- 19 in diagonal frame ($2,400)

Electro Mechanical Systems, Inc.
Touch Information Display Touch Screen

Features
- Custom designed touch screens
- Patented ambient light and noise reduction circuit
- Box frame and window frame configurations available
- Custom bezel redesign and display packaging available

Price: Quotes dependent on application

Computer Technology Associates
CTA 500X Soft-Touch Touch Screen with Interface

The touch screen interface is designed to be used with the Apple II+ or Apple IIe microcomputer, and the screen can attach to any 12-inch video monitor.

Features
- Infrared emitter-sensor array, self scanning
- 96 horizontal by 64 vertical point resolution
- Active touch area is 11x8 (vertical × horizontal)
- Outside dimensions (HxWxD) 12x10x¾ in
- Input power +5 v at 600 mA from Apple power supply
- Occupies one Apple II interface slot
- Parallel cable between screen and interface
- Apple computer buss between interface and CPU
- All necessary hardware and software supplied
- No extra assembly language subroutines necessary
- Screen accessed through Applesoft BASIC

Price: $695

New England Technology Group
Tech Graphics-1 Touch Screen

Features
- 1024x1024 screen resolution
- Speed is 200 xy points per second
- High quality anti-aliased fonts in various point sizes
- Supports text overlay in any color
- Compatible with NTSC, PAL, and SECAM systems
- Sync input allows genlocking to external source
- 60Hz or 50Hz CC1R output

Price: $2500 (includes 13-inch Amdek color monitor, with screen sensor mounted, interface card for Apple II or IIe microcomputer, cables, and software demo)

Options:
- Color graphics film recorder
- 35 mm slides
- 4x5, 8x10
- SX-70
- 16 or 35 mm film
- Pin registered
- Animation camera
- Video digitizer
- Color printer, ink jet printer

LIGHT PENS

Symtec
Professional Light Pen

Features
- Push-tip nose switch on pen
- 0.3 microsecond response time at 1 millilambert screen brightness
- Touch sensitive
- 12.5 mm diameter by 175 mm long (.5x6.875 in)

- Pen and cable weigh 168 gm (6 oz)
- Plug-in interface for compatible computers
- Adjustable for light sensitivity
- Can resolve a single pixel
- Compatible computer systems: Apple IIe, II+, and III; Atari 400 and 800; IBM-PC; Commodore VIC-20 and 64; Franklin Ace
- Compatible screens: any color TV or monitor; any black and white TV or monitor; most green screens

Prices:
$250 for Apple compatible
$175 for IBM-PC compatible
$15 extra for push-tip model

Video Associates Labs
LPS II Light Pen (by Gibson Labs)

Features
- True raster-scan light pen
- Locations are plotted 60 times per second

Price: $349

VOICE INPUT DEVICES

Personal Computer Supply
Voice Input Module

Features
- For use with Apple II or IIe
- Greater than 98% recognition accuracy
- Vocabulary listing and voice pattern stored on disc
- Uses one adapter slot
- Vocabulary is user defined
- 8K onboard memory
- Includes menu driven voice utility program
- Programs available for Visicalc, Wordstar, Magic Window, List Handler, Applesoft BASIC, and others
- Immediate response time
- 80 words or phrases per application
- Maximum word/phrase length 1.25 sec
- Minimum pause between words 160 msec
- Includes VIM board, cables, manual, voice utility program, and microphone

Prices for Apple II:
$845 for VIM-1 including handheld microphone
$920 for VIM-2 including gooseneck microphone
$950 for VIM-3 including headset microphone
Prices for Apple IIe:
$920 for VIM-1 including handheld microphone
$995 for VIM-2 including gooseneck microphone
$1,025 for VIM-3 including headset microphone

Options
- Introvoice II (160-word vocabulary) ($200)
- Wireless microphone (half mile distance) ($595)
- Noise-cancelling gooseneck microphone with foot pedal switch ($160)
- Noise-cancelling headset boom microphone ($180)
- Programer's reference manual ($20)

Scott Instruments
Voice-Based Learning System

Features
- For use with Apple II or IIe computers with 48K or Franklin computer
- 98% accuracy rate
- Instant response
- 40-word vocabulary, with overlays to access to additional sets of 40 word vocabularies
- Compatible with Pascal, FORTRAN, BASIC, Applesoft, Pilot, and Machine Code
- Compatible with modems, printers, and other peripherals
- Uses one Apple peripheral slot
- Compatible with VisiCalc, Visidex, Apple Plot, and the Source
- All systems include reference manuals, headset microphone, and voice entry terminal
- Maximum word length is 1.5 second

Prices:
$895 for VBLS System stand-alone version (includes author diskette)
$795 for VET-2 System computer-dependent system (includes system diskette)
$595 for Shadow/VET System computer-dependent system (includes system diskette)

VOICE SYNTHESIZER

Borg-Warner Educational Systems
UVS Ufonic Voice System

Features
- Capable of adding human-sounding voice to any CBI lesson
- Operates on Apple II or IIe computers
- Works in any available Apple slot
- Card contains microprocessor, memory, and synthesizer
- Includes external amplifier/speaker
- Instructional program and voice data are contained on single diskette
- Additional software available

Price: $495

Options

- UF-SC, Ufonic Speech Composer (includes four discs and teacher's guide to add speech to existing lessons ($225)

STILL-FRAME AUDIO DEVICES

EECO
VAC-300 Still-Frame Video/Audio Converter

Features

- Up to 40 seconds of audio per still frame of video
- Each audio frame can store 10 seconds of real-time audio
- With 54,000 frames possible at 10 seconds per frame, up to 540,000 seconds or 150 hours of audio are possible with no video (see chart below)
- Up to 120 hours of audio with 10,000 slides per disc side
- Compatible with interactive VCRS
- Computer controllable
- RS-232 interface
- Baud rates 300 to 9600
- Audio frequency response 100Hz to 3700Hz, -3 dB

Possible Frames Per Disc	Video Frames Per Segment	Audio Frames Per Segment	Number of Segments Possible	Audio Time Per Disc Side Sec./Hours
54,000	0	1	54,000	540,000/150.0
54,000	1	1	27,000	270,000/75.0
54,000	1	4	10,800	432,000/120.0
54,000	3	4	7,714	308,560/85.7
54,000	3	1	13,500	135,000/37.5

Price: $2,500

LaserData
PC-Trio Still Frame Audio Card

Features

- Single plug-in card for IBM-PC
- 75 hours of digital audio available on one disc side
- 800 mbytes of computer data available on one disc side
- 200 kbytes/sec maximum data transfer rate
- Corrected error rate better than 10–12
- NTSC video format
- Maximum data integrity achieved by proprietary error correction
- Three selectable levels of audio quality:

Level	Bandwidth Kilohertz	Sec./Frame	Sec./Event (standard)	Sec./Event (optional)
I	2.5	5	30	60
II	3.75	3.33	20	40
III	5.0	2.5	15	30

Price: $1,150

LaserData
Trio 110 Still Frame Audio Controller

Features

- Uses built-in Intel 8086 microprocessor
- 75 hours of digital audio available on one disc side
- 800 mbytes of computer data available on one disc side
- 400 kbytes/sec maximum data transfer rate
- Corrected error rate better than 10–12
- NTSC video format
- Can interface up to four disc players
- Can multiplex up to four computers
- Control software, information retrieval software, and diagnostic software available
- Three selectable levels of audio quality:

Level	Bandwidth Kilohertz	Sec./Frame	Sec./Event (standard)	Sec./Event (optional)
I	2.5	5	30	60
II	3.75	3.33	20	40
III	5.0	2.5	15	30

Price: $2,950.

Pioneer Video
SS-D1 Still Frame Audio System

Features
- Data storage capacity of 1000 floppy diskettes per side
- 35 hours of digital audio available on one disc side
- 427 mbytes of computer data available on one disc side
- Reed-Solomon error correction method
- RS-232, baud rate 300 to 38,400 selectable
- Error correction selectable between 10–4 to 10–12 for 0% to 53% redundancy
- Three selectable levels of audio quality:

Level	Bandwidth Kilohertz	Sec./Frame	Sec. SS-D1 Memory	Per Side Hours
I	2.5	3.6	28.1	35.2
II	5.0	1.8	14.0	17.6
III	7.5	1.2	9.3	11.7

Price: $1,500.

Sony Video
SFA-1000 Still-Frame Audio Adapter

Features
- Audio playback time of 1.5 to 20 seconds
- Optional expansion to total of 40 seconds allowing storage of 15 hours of linear audio per disc side
- Audio frequency response of 3.5kHz, -3 dB
- Video input, 1V p-p
- Remote control, wireless infrared or cable
- Power requirement AC 120V, 35 watts
- Dimensions (HxWxD) 82x250x354 mm (3.28x10x14.16 in)
- Weight 4 kg (8.8 lb)

Price: $2,500

VIDEODISC AUDIO NOISE REDUCTION SYSTEMS

Pioneer Video, Inc.
R-1000 CX Noise Reduction System

The CX noise reduction system is unique to the laser discs. It is a built-in feature in many of the players but can be purchased separately. This system allegedly can improve the signal-to-noise ratio of the reproduced discs by as much as 14 dB to more than 70 dB (1kHz, 100% mod. IHF A). When it is connected to a system, the user only has to turn it on. There are no adjustments to worry about.

Price: $80

VIDEODISC CHANGERS

Destron, Inc.
Videodisc Changer

Features
- For use with standard 12-inch laser disc systems, or 8-inch Direct Read After Write (DRAW) systems
- Compatible with Apple, Franklin Ace 1000, or IBM-PC
- Disc capacity 25 to 1000 discs
- Maximum of eight disc players
- 25 disc changer dimensions (HxWxD) 2x2x3 ft
- 500 disc changer dimensions (HxWxD) 7½x3x3 ft
- 120VAC
- 250 watts power consumption
- Worst access time is 30 seconds from frame X disc 1, to frame Y disc 250

Prices:
$6,000 for 25 disc changer
$30,000 for 500 disc changer

APPENDIX E. DIRECTORY OF LASER DISC SYSTEMS PACKAGES

APPLE COMPUTER INTERACTIVE VIDEODISC SYSTEMS

Actronics Learning Systems
CPR Learning System

This system is designed specifically for use in training for CPR certification or recertification.

Features
- Industrial laser disc player
- Microprocessor
- Random access audiocassette tape unit
- Two television monitors
- Light pen
- User control box
- Operating systems software
- One adult manikin
- All necessary cables and user documentation

Prices:
$20,000 for complete system
$2,500 for infant manikin

Allen Communications
Totally Integrated Interactive (TII) System

Features
- Allen Communications learning station
- VMI video microcomputer interface with demo
- Super Pilot authoring language with AC library diskette
- Pioneer industrial videodisc player PR-8210
- Apple II+ computer or equivalent
- Disc drive with controller
- 16K RAM card
- Amdek Color One 13-inch monitor

Price: $4,395

Options
- NEC color monitor with touch screen ($1,500)
- VB-3E Microkey overlay system ($2,195)
- Pioneer LD-V1000 ($1,200)
- Philips VP-832 player ($1,395)
- Gibson LPS-II light pen ($349)
- Koala Pad touch tablet ($125)

Digital Controls
The Incredible Teaching Machine

Features
- Fiberglass and wood cabinet, dimensions (HxWxD) 54x33x23½ in, weight 280 lb
- Audio amplifier with built-in speakers
- Interface package including Red Card, video switching, and junction box, cabling, operating software in BASIC and Pascal, and system documentation
- Apple II+ with 48K RAM, two disc drives, 5¼-½ floppy disc control, and controller cards
- Zenith or Sony 12-inch color video monitor
- Pioneer PR-7820 videodisc player
- Extra peripherals and options available

System Price: $6,407

International Institute of Applied Technology
Touche Interactive Videodisc System

Features
- Apple IIe microcomputer
- 64K RAM
- One disc drive
- Super Pilot authoring language
- High-resolution Sony monitor
- Touch screen
- Videodisc player
- Case for entire system, dimensions (HxWxD) 16½x21½x25 in, weight 75 lb

Prices:
$8,000 for basic system
$10,000 with workstation cabinet

Options
- Second disc drive
- 5 mb, 10 mb, and 20 mb hard discs
- High-resolution graphics package
- Video overlay

Learning Link Corporation
Learning Link Authoring and Delivery System

Features
- Simple modular design
- No disc drives needed at delivery sites
- Author on Apple IIe, IIc, IBM-PC, IBM-XT, or Kaypro computer

- Delivery system consists of Learning Link 8500 (microprocessor with interface device and text overlay)
- Still-frame audio optional
- Works with Pioneer LD-V4000 videodisc player
- RGB Dynamics touch screen on AM-1301 Mitsubishi color monitor
- Includes Learning Link authoring language

Price: Under $6,000 estimated

Raytheon Service Company
Raytrain Videodisc System

Features
- Apple II+ 48K mainframe
- 16K RAM card
- Apple-to-audiocassette interface and control
- DOS 3.3 disc drive with controller
- Light pen with interface card
- Videodisc interface card
- Sony videodisc player
- Audiocassette player
- Audio amplifier with speaker
- 19-inch color television monitor
- Fibreglass cabinet and cables, dimensions (HxWxD) 71x32x33, weight 250 lb
- Power requirements: 115V/60Hz, 5A
- Operating system software
- Touch screen
- RGB graphics

Price: $19,950

Options
- Microkeyer for computer video overlay
- Printer
- Bar code system

Superior Training Systems
Apple II/IIe Interactive Video System

This system is designed to be used with an Apple II/IIe with 64K, two disc drives, color monitor, and video player. The $2,400 package includes the Insight 2000 authoring system. Packages complete with fully wired learning center cabinet and peripherals are available.

Features
- Plug-in video controller interface board with cables for a compatible video player.
- Insight Plus courseware authoring system with both authoring and lesson diskettes.
- Detailed and quick start installation and courseware authoring manuals.
- Videotape (VHS or Beta) tutorial on effective courseware authoring techniques.
- To be used with the following disc players: Pioneer VP-1000 and 8210, Sony LDP-1000
- To be used with the following tape players: Panasonic 8200 VTR, Sony Beta, and U-Matic VTRs

Prices:
$1,690 for complete system for disc or tape
$2,400 for complete system for disc *and* tape
$695 for interface only for disc or tape
$895 for interface only for disc *and* tape

ATARI COMPUTER INTERACTIVE VIDEODISC SYSTEMS

New Media Graphics
DiscMaster Package 5400

Features
- DiscMaster 1000 videodisc interface
- Magnavox VC-8010 laser videodisc player
- Atari 400 computer with 16K memory
- Atari 810 disc drive
- Atari 850 interface module
- Atari CXL4002 BASIC computing language
- All necessary cables, connectors, and users manuals
- Demonstration package with disc and two programs
- Authoring program: Define Your Own Interactive Playback

Price: $2,995

Options
- Panasonic 12-inch television receiver ($189)
- Sanyo 19-inch color television receiver ($549)

New Media Graphics
DiscMaster Package 5800

Features
- DiscMaster 1000 videodisc interface
- Magnavox VC-8010 laser videodisc player
- Atari 800 computer with 16K memory and 32K memory module
- Two Atari 810 disc drives
- Atari 850 interface module
- Atari CXL4002 BASIC computing language
- All necessary cables, connectors, and users manuals
- Demonstration package with disc and two demo programs
- Authoring program: Define Your Own Interactive Playback

Price: $4,495

Options:
- Panasonic 12-inch television receiver ($189)
- Sanyo 19-inch color television receiver ($549)

PLATO INTERACTIVE VIDEODISC SYSTEMS

Control Data Corporation

CDC does not promote a specific videodisc delivery system but does advertise an authoring service for PLATO users. Any user of PLATO can take advantage of the videodisc technology with a Control Data PLATO terminal connected to a central PLATO System and a Level Three videodisc player, or a microcomputer that supports Control Data's Micro PLATO delivery software. PLATO-compatible terminals are the Control Data IST, IST II, IST III, Viking 721–30/31, IBM-PC, or Zenith Z100, and certain IBM-PC compatible microcomputers. Micro PLATO compatible microcomputers are the CDC110, IBM-PC, and Zenith Z100, and certain IBM-PC compatible microcomputers. For more information on the PLATO system, contact Control Data Corporation at the address listed.

DEC PRO 350 COMPUTER INTERACTIVE VIDEODISC SYSTEM

Digital Equipment Corporation
IVIS Interactive Video Information System

This system offers a stand-alone terminal that can be networked to a mainframe computer. The price listed is for the workstation and peripherals only. The authoring software and networking hardware must be purchased separately as well as the host mainframe. For detailed information on this system contact DEC at the address listed.

Features
- Digital Professional 350 personal computer
- Analog interface box
- VR241-A, RGB 13-inch color monitor
- Hitachi VP-9500 or Sony LDV-1000A videodisc player
- Software device driver
- RS-232C connectors
- Baud rate from 50 to 19,200
- Overlay enhancement (drop shadow width 1–15 pixels)
- Two floppy disc drives with 10 mbyte hard disk

Prices:
$12,400 for basic system
$13,400 with touch screen

Options
- PCXXF-CA workstation desk ($649)
- Floating point adaptor LA50-RA printer, 100 char/sec ($695)
- LA100-PC dot matrix printer 240 char/sec ($2,690)
- LQPO2-AA letter quality printer 32 char/sec ($2,800)
- BCC04–10 modem cables (10 ft) ($30)
- Pro/BASIC or Pro/Communications software packages QBA04-A3 ($195)

MicroTICCIT INTERACTIVE VIDEODISC SYSTEMS

Hazeltine Corporation
MicroTICCIT System II

The system II configuration is designed to optimize courseware development and delivery for medium-scale computer-based training efforts. The system will support up to 40 MicroTICCIT workstations, each of which can be used for student, instructor, or author functions. For detailed information on this system or any other systems, contact Hazeltine Corporation at the address listed.

Features
- Data General Micro Eclipse S/20 host processor with 256 kbytes RAM
- 50 mbytes of fixed storage for online system software, student records, and courseware
- 15.4 mbyte cartridge tape drive for loading or dumping data from fixed disc
- Data General operator console CRT for performing system startup, shutdown, and backup routines
- ARCNET local area network communications interface for remote locations of up to four miles
- Modem for interfacing to Hazeltine's MicroTICCIT maintenance service network
- Can use Adapt authoring system for courseware development

Price: $75,000

Option
- MicroTICCIT workstation ($7,000)

IBM-PC COMPUTER INTERACTIVE VIDEODISC SYSTEMS

Interactive Training Systems, Inc.
Interactive Videodisc Training System

Features
- IBM-PC microcomputer
- High-resolution color monitor

- Laser disc or videotape player
- ITS-2000 controller

Price: $10,564

Option
- Authoring software package ($12,000)

International Institute of Applied Technology
Touche Interactive Videodisc System

Features
- IBM-PC microcomputer
- One disc drive
- Super Pilot authoring language
- High-resolution Sony monitor
- Touch screen
- Videodisc player
- Case for entire system, dimensions (HxWxD) 16½x21½x25 in, weight 75 lb

Prices:
$9,000 for basic system
$11,000 with workstation cabinet

Options
- Second disc drive
- 5 mb, 10 mb and 20 mb hard discs
- High-resolution graphics package
- Video overlay

Online Computer Systems
IBM-PC PilotPlus Training System

Features
- IBM-PC with 128K RAM
- Two double-sided disc drives
- IBM or Okidata 92 80-column printer
- PilotPlus authoring software
- 12-inch Sony PVM 1270Q color monitor
- VDC-100 videodisc control card
- IBM color graphics card
- Pioneer LD-V1000 videodisc player (or equivalent)

Price: $6,000

Options
- Touch panel
- Graphics overlay
- IBM-PC XT 10 mb hard disc

Online Computer Systems
The Enhanced IBM-PC Discover System

Features
- IBM-PC XT (10 mb) hard disc system
- One 5¼-inch double-sided disc drive
- All cables and interface boards
- Discover software
- 12-inch Sony Profeel color monitor
- Graphics printer and printer stand
- BASIC interpreter
- Pioneer LD-V1000 videodisc player (or equivalent)
- CP/M-86

Price: $10,000

Options
- Touch panel
- Graphics overlay

Learning Link Corporation
Learning Link Authoring and Delivery System

Features
- Simple modular design
- No disc drives needed at delivery sites
- Author on IBM-PC, XT, Apple IIe, IIc, or Kaypro computer
- Delivery system consists of Learning Link 8500 (microprocessor with interface device and text overlay)
- Still-frame audio optional
- Works with Pioneer LD-V4000 videodisc player
- RGB Dynamics Touchscreen on AM-1301 Mitsubishi color monitor
- Includes Learning Link authoring language

Price: Under $6,000 estimated

Superior Training Systems
IBM-PC Interactive Video System

This system is designed to be used with an IBM-PC with 128K, two disc drives, color monitor, and video player. The $2,400 package includes the Insight 2000 authoring system. Packages complete with fully wired learning center cabinet and peripherals are available.

Features
- Video controller interface box with cables for compatible video player.
- Insight PC courseware authoring system with both authoring and lesson diskettes.

- Detailed and quick start installation and courseware authoring manuals.
- Videotape (VHS or Beta) tutorial on effective courseware authoring techniques.
- To be used with the following disc players: Pioneer VP-1000, 8210, Sony LDP-1000
- To be used with the following tape players: Panasonic 8200 VTR, Sony Beta, U-Matic VTRs

Prices:
$2,080 for complete system for disc or tape
$2,400 for complete system for disc *and* tape
$990 for interface only for disc or tape
$1,200 for interface only for disc *and* tape

Visage, Inc.
V:Station 2000 Interactive Videodisc System Series

Features
- Complete system includes IBM-PC, V:Link hardware interface, IBM-compatible color graphics adaptor, and comprehensive selection of standard and optional sotware
- Graphic overlay including 80-column text
- RGB output
- Control of most videodisc players
- Membrane touch screen (except V:Station 2001 and 2004)
- Touch screen resolution: Med-Res 256x256, Hi-Res 1024x1024
- Full range of software support
- System will run standard IBM-PC programs
- One monitor system
- 256K or 512K of dynamic RAM available
- 10 meg Winchester hard discs available

Prices:
$5,995 for Model 2001 floppy diskette-based system, 256K RAM
$7,695 for Model 2002-A floppy diskette-based system with Hi-Res touch screen, 256K RAM
$6,895 for Model 2002-B floppy diskette-based system with Med-Res touch screen, 256K RAM
$9,825 for 2003-A hard disc-based system with Hi-Res touch screen, 256K RAM
$9,125 for 2003-B hard disc-based system with Med-Res touch screen, 256K RAM
$7,385 for 2004 floppy diskette-based system, 512K RAM
$11,650 for 2005-A hard disc-based system with Hi-Res touch screen, 512K RAM
$10,850 for 2005-B hard disc-based system with Med-Res touch screen, 512K RAM

SONY SMC-70 COMPUTER INTERACTIVE VIDEODISC SYSTEM

Sony Video
Interactive Videodisc System with SFA-1000

Features
- LDP-1000 videodisc player
- SFA-1000 still-frame audio adapter
- SMC-70 microcomputer
- Disc drive
- PVM-1270Q color monitor

Price: $8,600

Options
- 17-key numeric keypad unit on 39-inch extension cord for calculator-style data entry
- Light pen for nonkeyboard data entry
- SMC-7086 16 bit adaptor (256RAM)
- VRP-100 printer
- Open ports for add-on peripherals
- SMI-7074 plug-in NTSC overlay module
- SMI-7073 plug-in RGB overlay module

WICAT INTERACTIVE VIDEODISC SYSTEMS

WICAT Systems
System 150 WS

These systems are the least expensive of the WICAT line. The 150 WS offers a stand-alone terminal that can be networked. The price listed is for the workstation only. The authoring software and networking hardware must be purchased separately. For detailed information on this system or any of the larger systems, contact WICAT at the address listed.

Features
- MC68000L8, 8mHz processor (approximately 1 million instructions per second)
- 16-bit processor (32-bit data operations)
- Memory management
- Seven vectored interrupt levels
- IEEE-796 (extended multibuss) buss architecture
- 256 kbytes of dynamic ECC RAM (expandable to 1.5 mbyte)
- 16/32 kbytes of EPROM
- Two programable interval timers
- Intelligent disc controller
- 10/15 mbyte 5¼-inch Winchester disc
- 960 kbyte 5¼-inch floppy disc drive (unformatted)
- 2–5 RS-232C serial interfaces (19.2 kbaud in asynchronous mode)

- 16-bit general-purpose parallel interface
- Operating system options: UNIX, CP/M emulator
- Language support: APL, Assembler, BASIC, C, COBOL, FORTRAN 77, and Pascal
- Can use WISE authoring system for courseware development

Price: $12,000

WIT

This system features an intelligent color graphics terminal with the videodisc option.

Features
- Optional touch screen monitor
- 16 color graphics from a palette of 4,096
- Graphics overlay
- Videodisc interface
- MC68000 microprocessor

Price: $7,275

APPENDIX F. DIRECTORY OF VIDEODISC SOFTWARE

AERONAUTICS

National Air and Space Museum Archive, Disc One
This disc is an archival collection of close to 100,000 still images of airplanes from the museum's holdings. The disc documents the history of aircraft from the early flying machines up to the aircraft of the 1940s. The images are the most requested photos of American as well as foreign aircraft. The disc comes with an index that identifies the aircraft by manufacturer.

Interactive CAV
Software: none needed in the Level One format
Smithsonian Institution (NASM)
Price: $36.50

National Air and Space Museum Archive, Disc Two
This disc is an archival collection of close to 100,000 still images of airplanes from the museum's holdings. The disc includes photos of many air and space personalities as well as several of the aircraft not covered on the first disc such as balloons, airships, and commercial airlines. Other interesting photos include air meets, trophies, military aviation, aeronautical communications and equipment, museums, philatelic covers, and models. The disc comes with a printed index.

Interactive CAV
Software: none needed in the Level One format
Smithsonian Institution (NASM)
Price: $36.50

National Air and Space Museum Archive, Disc Three
This disc is an archival collection of still photos from the museum's holdings. The disc includes photos of aircraft from the U.S. Air Force including World War II and pre-1940 planes. The disc comes with a table of contents listing the subject headings.

Interactive CAV
Software: none needed in the Level One format
Smithsonian Institution (NASM)
Price: $36.50

ART

National Gallery of Art
This disc was produced as the first catalog of art from a major museum to be made available to the public on videodisc. The disc is divided into two sections. The first section is a linear program that includes the story of the museum's beginnings and development, including rare photographs and historic film footage. The second section of the disc is an interactive catalog of 1,645 still frames of painting, sculptures, drawings, and prints from the Gallery. Each image is followed by a still frame of text identifying the artist and work. Following the catalog is a comprehensive tour through the collection narrated by the director of the Gallery, J. Carter Brown. The collection spans seven centuries of art.

Interactive CAV
Software: not needed for Level One applications
Pioneer Video, Catalog # VPI-NGA-84
Price: $95

Vincent Van Gogh: A Portrait in Two Parts
The program on the disc is in two parts. The first part on side one is an overview of the life of Van Gogh through his paintings and several letters to his brother Theo. Over 200 of his works are shown on this side in catalogs that group the works by period. Side two is a one-man play starring Leonard Nimoy as Theo, Vincent's brother. The contents are as follows:

Side 1. Van Gogh Revisited (hosted by Leonard Nimoy)
Chapt. 1 Overview, Dutch Period
Chapt. 2 Catalog: Major Works of Dutch Period
Chapt. 3 Overview, Paris Period
Chapt. 4 Catalog: Major Works of Paris Period
Chapt. 5 Overview, Arles Period
Chapt. 6 Catalog: Major Works of Arles Period
Chapt. 7 Overview, Saint Remy Period
Chapt. 8 Catalog: Major Works of Saint Remy Period
Chapt. 9 Overview, Auvers Period
Chapt. 10 Catalog: Major Works of Auvers Period
Chapt. 11 Painting Techniques: Reference Series
Chapt. 12 Brabant in Vincent's Time: Reference Series
Chapt. 13 Paris and Impressionism: Reference Series
Chapt. 14 Provence: The Land and People: Reference Series
Chapt. 15 Auvers, the Artists' Village: Reference Series

Chapt. 16 Summary
Chapt. 17 Credits

Side 2. Vincent: The Play
This is a two-act one-man show starring Leonard Nimoy as Theo Van Gogh, Vincent's brother.

Interactive CAV
Software: none needed in the Level One format
Pioneer Video
Price: $49.95

Profiles in American Art
A series of twelve half-hour discs documenting the ideas and works of some of today's American artists, painters, and sculptors. The programs penetrate the lives and minds of these painters and sculptors to help the viewer understand that elusive mix of talent, skill, and magic we call art. The following individuals have been included in this series hosted by Alexander Scourby:

Eric Sloan, painter and writer
Donald Teague, watercolorist
John Clymer, painter
Edward Fraughton, sculptor
Glenna Goodacre, painter
William Whitaker, painter
Conrad Schwiering, painter
Sergei Bongart, painter & poet
George Carlson, sculptor
Wilson Hurley, painter
John Stobart, painter
Bob Kuhn, painter

The discs are also available in a Collector's Edition with a special case and a signed and numbered disc. A limit of 100 sets are available.

Interactive CAV
Software: none needed in the Level One format
American Technology Resources
Prices:
$95 per disc, $995 for set of twelve.
Collector's Edition: $395 per disc, $3995 for set.

Philip Perlstein Draws the Artist's Model
This disc is the first in a series called "Genius in Our Time." Each one of the series projects will cover the work of some creative, living person whose work will live long after that person's death. Each one will be a documented disc of that artist, architect, dancer, conductor, and so on. This disc showcases the teaching, philosophy, and art of Perlstein, considered one of America's most prestigious realist painters. The paintings of the artist are cataloged on the disc along with video footage of Perlstein in his studio, his classes, and at the opening of one of his shows. Interactivity is provided by several exercises specifically designed by Perlstein for artists as well as theories and instruction taught with the computer graphics. In doing this, the artist creates five new works.

Interactive CAV
Software: none needed in the Level One format
Interactive Media Corporation
Price: $49.95

BUSINESS MANAGEMENT

Fair Employment Practice
This course offers a new approach to management and supervisory training programs. It teaches managers and supervisors how to use the principles of good management to find, hire, and place productive employees, as well as how to promote, transfer, and supervise them. It also addresses handling discipline and discharge as well as preventing sexual harassment, all within the bounds of EEOC regulations. The disc is divided into four 15-minute units: Recruitment, Selection and Placement; Promotion and Transfer; Discipline and Discharge; and Preventing Sexual Harassment. During the course of the program the videodisc poses multiple-choice questions that the user must answer correctly before the program proceeds.

This videodisc requires the Pioneer PR-7820 or LD-V6000 player for interactive functions. The handset is needed for user input.

Interactive CAV
Software: Level Two programing on the disc
BNA Communications Inc.
Price: $1,500 for one-year rental.

COMPUTER SCIENCE

Computer Literacy, Disc 1
This is a two-disc computer literacy course with 12 to 15 hours of instruction. The course can be used with the IBM-PC or Apple computer systems. Online testing and record keeping are available. Software can be altered with the Disc Writer authoring language. An online index and glossary are provided, as well as test questions.

Side 1. Hardware
Videodisc operating instructions

Microcomputer overview
History of computers
Primary and secondary storage
Printers
Common peripherals
Input devices
Processing

Side 2. Software
Introduction to software
Applications programs
Word processing
Electronic spreadsheet
Database management
Business graphics
Advanced topics:
- Programing
- Operating systems
- Boolean logic

Programed CAV
Software: written for IBM or Apple
JAM, Inc.
Price: $1,995 for set of two discs, software, and manual

Computer Literacy, Disc 2
This is a two-disc computer literacy course with 12 to 15 hours of instruction. The course can be used with the IBM-PC or Apple computer systems. Online testing and record keeping are available. Software can be altered with the Disc Writer authoring language. An online index and glossary are provided, as well as test questions.

Side 3. Telecommunications
SIDE 4
Introduction to telecommunications
Modems
Telecommunications software
Local area networks
Consumer information databases
Videodisc/Videotex

Side 4. New Technologies
Industrial robotics
CAD/CAM
Optical storage
Integrated software

Programed CAV
Software: written for IBM-PC or Apple
JAM, Inc.
Price: $1,995 for set of two discs, software, and manual

The World of dBase
The program was written by Wayne Ratliff who invented the dBase language for computers, and Robert Byer who has written several books on the subject of dBase.

Linear CLV
Software: None available
Pioneer Video
Price: $34.95

DANCE—BALLET

Don Quixote
The American Ballet Theatre at the Metropolitan Opera House with Mikhail Baryshnikov.

Pioneer Video
Linear CLV
Price: $34.95

La Fille Mal Garde
The Royal Ballet at Covent Garden, Frederick Ashton, choreographer. 100 minutes.

Pioneer Video, Catalog # PA-81-007
Linear CLV
Price: $34.95

Manon
The Royal Ballet at the Royal Opera House, Frederick Ashton, choreographer. January 1982. 112 minutes.

Pioneer Video, Catalog # PA-83-047
Linear CLV
Price: $34.95

Nutcracker
American Ballet Theatre, with the National Philharmonic conducted by Kenneth Schermerhorn. Mikhail Baryshnikov, Gelsey Kirkland, and Alexander Minz. 79 minutes.

Pioneer Video, Catalog # PA-82-032
Linear CLV
Price: $34.95

Sleeping Beauty
The Kirov Ballet, Marius Petipa choreographer. Irina Kolpakova and Sergei Berezhnoi. 1982, 164 minutes.

Pioneer Video, Catalog # PA-83-055
Linear CLV
Price: $39.95

Swan Lake
The Royal Ballet at Covent Garden, Marius Petipa and Levivanov choreographers. July 28, 1980. Natalia Makarova and Anthony Dowell. 128 minutes

Pioneer Video, Catalog # PA-82-018
Linear CLV
Price: $39.95

DANCE—INSTRUCTION

Belly Dancing: You Can Do It
This series of programs instructs you on how to become an accomplished belly dancer. Each lesson is progressively more difficult and includes reviews of previous lessons. Dual audio capabilities of the laser-disc system are used with this disc. Belly rolls, flutters, and the shimmy are included in the instruction.

Interactive CAV
Software: not needed for Level One applications
Pioner Video, Catalog # 37-602
Price: $29.95

ECONOMICS

Introduction to Economics
This package is designed to be a seven-week self-instructional course in economics geared for eighth grade students through the adult learner. A student manual is included to reinforce concepts and ideas through written exercises while serving as a reference for study and review. Included in the package price are 10 Apple II diskettes, Apple II/Videodisc interface board, and teacher and student manuals.

Side 1.
How to use the equipment
Pretest
Resources
Wants and needs
Scarcity
Resource allocation
Choices: influences of values
Choices: society's goals
Social goals and trade-offs
Decisionmaking: a process
Making economic decisions: a case study
Posttest

Side 2.
Pretest
Economic systems
Circular flow: household and business
Circular flow: government and households
Factors of production
Business organizations
Government in the economy
Money
Banking
The Federal Reserve
Summary
Posttest

Hardware Requirements: Apple II with 48K, two disc drives, two monitors (computer monitor and TV monitor), and a Pioneer VP-1000 videodisc player

Programed CAV
Software: provided for Apple II (10 diskettes)
Minnesota Educational Computing Consortium
Price: $500 for package

ELECTRONICS

New Electronic Technologies
This is a six-disc electronics course. Floppy disks are included with the program software. Student testing and record keeping are included. Each course takes about two to three hours and 12 to 15 hours for all six courses. A user's guide is included in the package. Topics included are listed below:

Disc 1. Integrated Circuits
Advantages of integrated circuits
Semiconductor materials
Integrated circuit manufacturing

Disc 2. Displays
Types of displays
- Display overview
- CRTs
- Projection systems
- LEDs
- LCDs
- Thin-film transistor-based displays
- Plasma panels

Television Systems
- Television fundamentals
- Color television
- Advanced television

Disc 3. Electronic Imaging
Introduction to imaging
- Signals
- Bandwidth

Image capture
- Color systems
- Camera tubes
- Solid-state image sensors

Image processing
- Error correction and concealment
- Overall enhancement techniques

Disc 4. Magnetic Storage and Retrieval
Basic recording process
Tapes and discs
Storage density
Video format

Disc 5. Optical Systems
Nonmagnetic recording
- Capacitance systems
- Optical systems

Fiber Optics
- Operating principles
- Communication
- Local area networks
- Integrated optoelectronics

Disc 6. Transmission Systems
Cable Television
- Videotex
- Coaxial cable
- Interactive cable

Satellites
- Basics
- Costs
- Current and future markets

Fiber Optics
- Operating principles
- Communications

Local area networks
Integrated optoelectronics

Interactive CAV
Software: on floppy disks for Apple or IBM compatibles.
JAM, Inc.
Price: $6,750 for all six, or $1,950 each

ELEMENTARY EDUCATION

The First National Kidisc
This disc was nominated for a Grammy because of its originality. Content includes 26 chapters of instruction for kids of all ages and allows for a high level of interaction.

Chapters include:
1. Choosing Sides
2. Paper Flying Machines
3. The Flag Game
4. Sign Language
5. Terry Teaches the Jig
6. Movie Magic Flip Book
7. Flying
8. The Kidisc Target Game
9. Knot Tying
10. Three Card Monty
11. A Trip to the Zoo
12. Cat's Cradle
13. 101 Jokes and Riddles
14. Waterglass Xylophone
15. Pig Latin
16. The Dinosaur Game
17. The Performing Paperclips
18. The Origami Crane
19. Terry Teaches Rock Dancing
20. A Trip to Universal Studios
21. The Secret Code Maker
22. The Kidisc Bar Game
23. The Amazing Rope Trick
24. Puzzlers
25. Athletes in Motion
26. Closing

Interactive CAV
Software: not needed for Level One applications
Optical Programming Associates
Price: $19.95

Fun and Games
This is a two-sided sequel to the popular Kidisc instructional games. Activities can be as interactive as necessary. The contents are listed by chapter below.

Side 1.
1. Choosing Up Sides
2. Tongue Twister
3. Monster Match
4. Flying Discs
5. Pinata Party
6. Journey of the Circle
7. Hand Shadows
8. Fun with Meadowlark
9. Marbles
10. Discomobile
11. Puppets
12. Tongue Twister
13. Card Shuffles
14. Close Up

15. Stunts
16. Charades
17. Tongue Twister
18. Hopscotch
19. Index, Side 1

Side 2.
20. Semaphone
21. On the Rise
22. Yo-Yo's
23. Clapping Games
24. Tongue Twister
25. Kites
26. Double Dutch
27. Pictures Worth 1000 Words
28. Juggling
29. Tongue Twister
30. Palmistry
31. Tap Dancing
32. Mission Unite
33. Solitaire
34. Tongue Twister
35. Off to the Races
36. Silly Songs
37. Skelly
38. Jacks
39. Tongue Twister
40. Stick Ball
41. Index, Side 2

Interactive CAV
Software: not needed in Level One applications
Optical Programming Associates
Price: $29.95

Villa Alegre (Happy Village)
This videodisc series is the Emmy Award-winning public television show put into an interactive format by the Nebraska Videodisc Design Production group and the U.S. Department of Education. Ten 30-minute programs are contained on five discs. The educational content is in the form of entertaining situations, stories, games, music, dances, and visual techniques. For students ages 5 to 8.

This series comes with four diskettes for use with a microcomputer. Suggested hardware is as follows:
Disc Player: Magnavision 8010, Pioneer VP-1000 or LD-1100
Microcomputer: Apple II+ (3.3 DOS) or TRS-80 III
Videodisc Interface:
- VMI (for Apple computers)
- Allen Communications
- Disc Master 1000 (for TRS computers)
- New Media Graphics

Programed CAV
Software: written for TRS-80 III and Apple II+
GPN
Price: $595 for 5-disc series, manual, and software.

ELEMENTARY EDUCATION—CHILDREN'S FILMS

Alice in Wonderland
The animated Disney version of the Lewis Carroll story. 1951, 75 minutes.

Pioneer Video, Catalog # 42036AS
Linear CLV
Price: $34.95

The Boy Who Left Home To Find Out About the Shivers
Dana Hill, Christopher Lee, Frank Zappa. This is a program in the Faerie Tale Theatre series about a boy who wants to learn about fear. 1983, closed captions.

Pioneer Video, Catalog # 6393–80
Linear CLV
Price: $29.98

Dumbo
The Disney animated classic about the elephant with oversized ears. 1951, 63 minutes.

Pioneer Video, Catalog # 42024AS
Linear CLV
Price: $34.95

Dunder Klumpen
Animated/live-action disc about the two-foot tall Dunder Klumpen who steals a young girl's dolls and brings them to life because he is lonely. 1979, 85 minutes.

Pioneer Video, Catalog # VL3012
Linear CLV
Price: $34.95

Fraggle Songs Volume One
This disc features the Muppets singing many of their hit songs. 1983, 51 minutes.

Pioneer Video, Catalog # 810AS
Linear CLV
Price: $24.95

The Frog Prince
Kermit stars in the Muppet's version of the classic fairy tale. 1971, 50 minutes.

Pioneer Video, Catalog # 42805AS
Linear CLV
Price: $24.95

Goldilocks and the Three Bears
Tatum O'Neal, Alex Karras, Carole King. This disc, from the Faerie Tale Theatre series, brings the classic fairy tale to life. 1983, closed captions.

Pioneer Video, Catalog # 6368–80
Linear CLV
Price: $29.98

Gulliver's Travels
This is an animated version of the Jonathan Swift novel about Gulliver and the war between Lilliput and Biefuscu. 1977, 74 minutes.

Pioneer Video, Catalog # VL2011
Linear CLV
Price: $34.95

Hansel and Gretel
Ricky Schroder, Joan Collins. This disc is in the Faerie Tale Theatre series. 1982, closed captions.

Pioneer Video, Catalog # 6409–80
Linear CLV
Price: $29.98

Hey, Cinderella
The Muppets are featured with Pat Galloway and Joyce Gordon. Lively songs and Muppet creatures give a new look to the classic tale. 1970, 54 minutes.

Pioneer Video, Catalog # 42806AS
Linear CLV
Price: $24.95

Jack and the Beanstalk
Dennis Christopher, Jean Stapleton, Elliot Gould. Another disc in the Faerie Tale Theatre series. 1983, closed captions.

Pioneer Video, Catalog # 6369–80
Linear CLV
Price: $29.98

Little Red Riding Hood
Malcolm McDowell, Mary Steenburgen. A disc in the Faerie Tale Theatre series based on the classic tale. 1983, closed captions.

Pioneer Video, Catalog # 6398–80
Linear CLV
Price: $29.98

Pinnochio
James Coburn, Carl Reiner. This version is part of the Faerie Tale Theatre series. 1983, closed captions.

Pioneer Video, Catalog # 6390–80
Linear CLV
Price: $29.98

Rapunzel
Shelly Duvall, Jeff Bridges, Gena Rowlands. This is a modernized version of the classic tale by the Faerie Tale Theatre. 1983, closed captions.

Pioneer Video, Catalog # 6370–80
Linear CLV
Price: $29.98

Rumpelstiltskin
Ned Beatty, Shelly Duvall. This is a feature from the Faerie Tale Theatre. 1984, closed captions.

Pioneer Video, Catalog # 6391–80
Linear CLV
Price: $29.98

Sleeping Beauty
Christopher Reeve, Bernadette Peters, Beverly D'Angelo. A modern day version of the classic tale by the Faerie Tale Theatre. 1983, closed captions.

Pioneer Video, Catalog # 6371–80
Linear CLV
Price: $29.98

Tale of the Frog Prince
Robin Williams, Teri Garr. This disc is another story in the Faerie Tale Theatre series. 1983.

Pioneer Video, Catalog # 6372–80
Linear CLV
Price: $29.98

Winnie the Pooh
This disc is Disney's version of the A. A. Milne classic story of Winnie the Pooh. 1977, 74 minutes.

Pioneer Video, Catalog # 25AS
Linear CLV
Price: $34.95

The Wizard of Oz
Aileen Quinn, Lorne Green. Animated version of the classic story of Dorthy's travels through Oz. 1983, 78 minutes.

Pioneer Video, Catalog # LV2322
Linear CLV
Price: $29.95

FILM STUDIES

The Adventures of Robin Hood
Errol Flynn, Olivia de Havilland, Claude Rains, Basil Rathbone, Alan Hale. 1938, 102 minutes.

Pioneer Video, Catalog # 4540–80
Linear CLV
Price: $34.98

African Queen
Humphrey Bogart, Katherine Hepburn, Robert Morley, Theodore Bikel. Directed by John Huston. 1951, 105 minutes.

Pioneer Video, Catalog # 2025–80
Linear CLV
Price: $34.95

Arsenic and Old Lace
Cary Grant, Raymond Massey, Peter Lorre, Josephine Hull, Jean Adair, Jack Carson. Directed by Frank Capra. 1944, 118 minutes. B&W

Pioneer Video, Catalog # 4603–80
Linear CLV
Price: $34.98

Barefoot in the Park
Robert Redford, Jane Fonda, Charles Boyer, Mildred Natwick. Directed by Gene Saks. 1967, 106 minutes.

Pioneer Video, Catalog # LV-8027
Linear CLV
Price: $29.95

Ben Hur
Charlton Heston, Jack Hawkins, Stephen Boyd, Hugh Griffith, Sam Jaffe. Directed by William Wyler. 1959, 211 minutes.

Pioneer Video, Catalog # ML100004
Linear CLV
Price: $39.95

The Big Sleep
Humphrey Bogart, Lauren Bacall, Martha Vickers, Elisha Cook Jr., Dorothy Malone. Directed by Howard Hawks. 1946, 114 minutes. B&W

Pioneer Video, Catalog # 4532–80
Linear CLV
Price: $34.98

Bridge on the River Kwai
William Holden, Alec Guinness, Jack Hawkins, Sessue Hayakawa, James Donald. Directed by David Lean. 1957, 161 minutes.

Pioneer Video, Catalog # VLD2010
Linear CLV
Price: $34.95

Casablanca
Humphrey Bogart, Ingrid Bergman, Peter Lorre, Sydney Greenstreet, Paul Henreid, Claude Rains. Directed by Michael Curtiz. 1943, 102 minutes. B&W

Pioneer Video, Catalog # 4514–80
Linear CLV
Price: $39.98

Cat on a Hot Tin Roof
Elizabeth Taylor, Paul Newman, Burl Ives, Jack Carson. Directed by Richard Brooks. 1958, 108 minutes.

Pioneer Video, Catalog # ML100060
Linear CLV
Price: $25.95

Citizen Kane
Orson Wells, Joseph Cotton, Everett Sloane, Dorothy Comingore, Ray Collins, Agnes Moorehead. Directed by Orson Wells. 1941, 119 minutes. Includes a visual

essay of over 100 photos, many never published before, and a rarely seen 3-minute trailer made by Wells from original footage not contained in the film itself.

Criterion Publishers
Interactive CAV
Price: $89.95

Cool Hand Luke
Paul Newman, George Kennedy, J. D. Cannon, Strother Martin, Jo Van Fleet. Directed by Stuart Rosenberg. 1967, 126 minutes.

Pioneer Video, Catalog # 11037LV
Linear CLV
Price: $39.98

A Day at the Races
The Marx Brothers, Margaret Dumont, Alan Jones, Maureen O'Sullivan. 1937, 109 minutes. B&W

Pioneer Video, Catalog # ML100064
Linear CLV
Price: $25.95

Dr. Strangelove
Peter Sellers, Sterling Hayden, George C. Scott, James Earl Jones, Keenan Wynn, Slim Pickens. Directed by Stanley Kubrick. 1964. B&W

Pioneer Video, Catalog # VLD3134
Linear CLV
Price: $29.95

Dr. Zhivago
Geraldine Chaplin, Julie Christie, Omar Sharif, Rod Steiger, Alec Guinnes, Tom Courtenay. Directed by David Lean. 1965, 176 minutes.

Pioneer Video, Catalog # ML100003
Linear CLV
Price: $39.95

Easy Rider
Peter Fonda, Dennis Hopper, Jack Nicholson. 1969, 88 minutes.

Pioneer Video, Catalog # VLD3140
Linear CLV
Price: $29.95

The Flying Deuces
Stan Laurel, Oliver Hardy, Jean Parker, Reginald Gardner. 1933, 67 minutes. B&W

Pioneer Video, Catalog # VL2009
Linear CLV
Price: $34.95

French Connection
Gene Hackman, Fernando Rey, Roy Scheider, Tony LoBianco, Marcel Bozzuffi. Directed by William Friedkin. 1971, 104 minutes.

Pioneer Video, Catalog # 1009–80
Linear CLV
Price: $29.98

Goodbye Columbus
Richard Benjamin, Jack Klugman, Ali MacGraw, Nan Martin. Directed by Larry Pierce. 1969.

Pioneer Video, Catalog # LV6826
Linear CLV
Price: $29.95

The Graduate
Ann Bancroft, Dustin Hoffman, Katharine Ross. Directed by Mike Nichols. 1967, 106 minutes.

Pioneer Video, Catalog # 4006–80
Linear CLV
Price: $34.98

The Greatest Show on Earth
Betty Hutton, Cornel Wilde, Charlton Heston, James Stewart, Dorothy Lamour. Directed by Cecil B. De Mille. 1952, 149 minutes.

Pioneer Video, Catalog # LV6617
Linear CLV
Price: $35.95

High Sierra
Humphrey Bogart, Ida Lupino, Cornel Wilde, Arthur Kennedy, Joan Leslie, Alan Curtis. Directed by Raoul Walsh. 1940, 100 minutes. B&W

Pioneer Video, Catalog # 4629–80
Linear CLV
Price: $34.98

Hud
Paul Newman, Patricia Neal, Melvyn Douglas, Brandon De Wilde. 1962, 112 minutes. B&W

Pioneer Video, Catalog # LV6630
Linear CLV
Price: $29.95

Key Largo
Edward G. Robinson, Humphrey Bogart, Lauren Bacall, Lionel Barrymore, Claire Trevor, Thomas Gomez, Dan Seymour, Monte Blue, Jay Silverheels. Directed by John Houston. 1948, 101 minutes. B&W

Pioneer Video, Catalog # 4594–80
Linear CLV
Price: $34.98

King Kong
Fay Wray, Robert Armstrong, Bruce Cabot, Frank Reichter, Sam Hardy. Directed by Merian C. Cooper. 1933, 101 minutes. Included is a running commentary by Ronald Haver on audio track two and a visual essay on the making of King Kong.

Criterion Publishers
Interactive CAV
Price: $74.95

Lawrence of Arabia
Peter O'Toole, Alec Guinness, Anthony Quinn, Omar Sharif. 1962.

Pioneer Video, Catalog # VLD3250
Linear CLV
Price: $39.95

Maltese Falcon
Humphrey Bogart, Sydney Greenstreet, Mary Astor, Peter Lorre. Directed by John Huston. 1941, 101 minutes. B&W

Pioneer Video, Catalog # 4530–80
Linear CLV
Price: $34.98

A Man for All Seasons
Robert Shaw, Paul Scofield, Orson Wells, Wendy Hiller, Susannah York. Directed by Fred Zinneman. 1966.

Pioneer Video, Catalog # LVD3332
Linear CLV
Price: $34.95

M*A*S*H
Donald Sutherland, Elliott Gould, Sally Kellerman, Tom Skerritt, JoAnn Pflug, Robert Duval. Directed by Robert Altman. 1969, 116 minutes.

Pioneer Video, Catalog # 1038–80
Linear CLV
Price: $39.98

Mutiny on the Bounty
Charles Laughton, Clark Gable. 1935, 98 minutes. B&W

Pioneer Video, Catalog # ML100450
Linear CLV
Price: $39.95

North by Northwest
Cary Grant, Eva Marie-Saint, James Mason, Leo G. Carroll. Directed by Alfred Hitchcock. 1959, 136 minutes.

Pioneer Video, Catalog # ML100104
Linear CLV
Price: $39.95

Notorious
Cary Grant, Ingrid Bergman, Claude Raines, Louis Calhern, Madame Konstantin. Directed by Alfred Hitchcock. 1946, 103 minutes. B&W

Pioneer Video, Catalog # 8011–80
Linear CLV
Price: $29.98

Patton
George C. Scott, Karl Malden, Stephen Young. Directed by Franklin J. Schaffner. 1969, 171 minutes.

Pioneer Video, Catalog # 1005–80
Linear CLV
Price: $49.98

A Place in the Sun
Elizabeth Taylor, Montgomery Clift, Shelly Winters. Directed by George Stevens. 1951, 128 minutes. B&W

Pioneer Video, Catalog # LV5815
Linear CLV
Price: $35.95

The Pride of the Yankees
Gary Cooper, Walter Brennan, Babe Ruth, Theresa Wright. 1942, 127 minutes. B&W

Pioneer Video, Catalog # 7145–80
Linear CLV
Price: $34.98

The Producers
Zero Mostel, Gene Wilder, Kenneth Mars, Dick Shawn, Estelle Winwood. Directed by Mel Brooks. 1967, 88 minutes.

Pioneer Video, Catalog # 4058–80
Linear CLV
Price: $29.98

Rear Window
James Stewart, Grace Kelly. Directed by Alfred Hitchcock. 1954.

Pioneer Video
Linear CLV
Price: $29.98

Rebel Without a Cause
James Dean, Natalie Wood, Sal Mineo, Jim Backus. Directed by Nicholas Ray. 1955, 111 minutes.

Pioneer Video, Catalog # 1011LV
Linear CLV
Price: $34.98

Roman Holiday
Gregory Peck, Audrey Hepburn, Eddie Albert. Directed by William Wyler. 1953, 118 minutes. B&W

Pioneer Video, Catalog # LV6204
Linear CLV
Price: $29.95

Romeo and Juliet
Olivia Hussey, Leonard Whiting, Michael York. Directed by Franco Zeffirelli. 1968, 138 minutes.

Pioneer Video, Catalog # LV6809
Linear CLV
Price: $35.95

Samson and Delilah
Hedy Lamarr, Victor Mature, Angela Lansbury, George Sanders, Henry Wilcoxon, Olive Deering, Fay Holden. Directed by Cecil B. De Mille. 1949, 128 minutes.

Pioneer Video, Catalog # LV6726
Linear CLV
Price: $35.98

Some Like It Hot
Marilyn Monroe, Tony Curtis, Jack Lemmon, George Raft, Pat O'Brien, Nehemiah Persoff. 1958, 121 minutes. B&W

Pioneer Video, Catalog # 4577–80
Linear CLV
Price: $39.98

A Streetcar Named Desire
Marlon Brando, Vivian Leigh, Kim Hunter, Karl Malden. Directed by Elia Kazan. 1951, 122 minutes. B&W

Pioneer Video, Catalog # 4571–80
Linear CLV
Price: $34.98

Suddenly Last Summer
Elizabeth Taylor, Montgomery Clift, Katherine Hepburn. 1959. B&W

Pioneer Video, Catalog # VLD5560
Linear CLV
Price: $29.95

Sunset Boulevard
William Holden, Gloria Swanson, Erich von Stroheim, Nancy Olsen. Directed by Billy Wilder. 1950, 110 minutes. B&W

Pioneer Video, Catalog # LV4927
Linear CLV
Price: $29.95

The Ten Commandments
Charlton Heston, Yul Brynner, Anne Baxter, Yvonne De Carlo. Directed by Cecil B. De Mille. 1956, 220 minutes.

Pioneer Video, Catalog # LV6524
Linear CLV
Price: $39.95

To Catch a Thief
Cary Grant, Grace Kelly, Jessie Royce Landis. Directed by Alfred Hitchcock. 1955, 103 minutes.

Pioneer Video, Catalog # LV 6308
Linear CLV
Price: $29.95

Tom Jones
Albert Finney, Susannah York, Hugh Griffith, Dame Edith Evans, David Tomlinson. Directed by Tony Richardson. 1963, 127 minutes.

Pioneer Video, Catalog # 4511–80
Linear CLV
Price: $34.98

Treasure of Sierra Madre
Humphrey Bogart, Walter Huston, Tim Holt, Bruce Bennett. Directed by John Huston. 1948, 126 minutes. B&W

Pioneer Video, Catalog # 4639–80
Linear CLV
Price: $34.98

20,000 Leagues Under the Sea
Kirk Douglas, James Mason, Peter Lorre. 1954, 118 minutes.

Pioneer Video, Catalog # 42112AS
Linear CLV
Price: $34.95

2001, A Space Odyssey
Keir Dullea, Gary Lockwood. Directed by Stanley Kubrick. 1968, 139 minutes.

Pioneer Video, Catalog # ML100002
Linear CLV
Price: $39.95

Vertigo
James Stewart, Kim Novak. Directed by Alfred Hitchcock. 1958, 128 minutes.

Pioneer Video, Catalog # 40082
Linear CLV
Price: $39.98

War of the Worlds
Gene Barry, Ann Robinson, Les Tremayne. 1953, 85 minutes.

Pioneer Video, Catalog # LV5303
Linear CLV
Price: $29.95

We're No Angels
Humphrey Bogart, Aldo Ray, Peter Ustinov. 1955, 103 minutes.

Pioneer Video, Catalog # LV5414
Linear CLV
Price: $29.95

FINANCE

The Joy of Stocks: Forbes Guide to the Stock Market
This disc offers step-by-step lessons in how to invest wisely in stocks. Topics include evaluating stocks' safety and growth potential and anticipating market shifts. 1984, 104 minutes.

Linear CLV
Software: none needed in Level One applications
Pioneer Video, Catalog # ML100332
Price: $34.95

HEALTH INSTRUCTION

The Way We Live
Up to fifteen viewers control an interactive exhibit, choosing one of four characters as a surrogate. The story branches according to the character chosen and other health-related choices made via a computer-linked voting system. The object is to make choices that will offer the best lifestyle for a longer lifespan. The majority vote is the deciding factor. In deciding whether their character should go to work by car, bicycle, or bus, for example, a vote for the bus increases life expectancy because accidents are less common in busses than cars or on bicycles.

Hardware requirements:
Pioneer PR-8210 videodisc player
Atari 800 system with 48K, 810 interface, disc drive, and 850 module

One large screen color monitor and two smaller monitors for data and voting display.

Optional hardware:
Extra input keypads for the "Computer Tally" system are available for $150 each (five are supplied with basic package).

Programed CAV
Software: Atari written in Forth
Interactive Image Technologies Inc.
Price: $5,000 for basic package of a five-input system, one videodisc and controlling software

HISTORY

The History Disquiz
This disc is a one-hour program that will test one's knowledge of 20th century history. Film clips of such events as the Beatles invasion, the first moon landing, and the explosion of the Hindenberg are followed by questions. Score points as you follow the action. Steve Allen is the host for the program. The History Disquiz covers a wide range of topics including politics, entertainment, science, international affairs, trends, and sports to name a few.

Interactive CAV
Software: not needed for Level One applications
Optical Programming Associates
Price: $29.95

HORTICULTURE

Gardening at Home
This disc provides the fundamentals of gardening for both the beginner and expert. A plant guide includes over 350 plants to help guide the user in their care and growth. The dual audio capabilities of the laser disc are used for separate audio programs.

Interactive CAV
Software: not needed in Level One applications
Pioneer Video, Catalog # 11–110
Price: $29.95

LANGUAGE

Exploring Language: Thinking, Writing, Communicating
This series of discs is designed to be a lower-level humanities course. The series has a dual purpose: to explore the social, psychological, and political implications of language, and to teach the fundamentals of clear, concise writing by providing week-by-week instruction in organizing and writing essays. The composition and language-study parts of this course complement each other. The composition portion helps to improve a student's awareness of the language environment. These topics include the structure and function of language, how language is acquired, how language is used for manipulation in politics and advertising, and how it is a medium for sexism and chauvinism. This dual focus helps students to understand and to use language more effectively. Portions of six texts and a course guide are required if the discs are used for credit. Suggested credit value is six semester-hours. Content of the discs is listed below.

Program 1: The Shape of Language
Program 2: Communities of Speech
Program 3: Language, Learning and Children
Program 4: The Rhyme and Reason of Politics
Program 5: The Written Word
Program 6: Men, Women and Language
Program 7: Just Plain English
Program 8: Apes and Language
Program 9: The State of English

Interactive CAV
Software: not needed for Level One applications
Maryland Center for Public Broadcating
Price: $125 per disc, $500 for the set. Print materials cost an additional $60

LEGAL EDUCATION

Evidence Objections
This disc is designed to augment the instruction that a law student receives in an Evidence and Trial Advocacy course. Each student can use the exercise individually or in a team of two to get experience in recognizing when to object and how to argue in support of an objection. The law student will play the role of defense counsel in a criminal trial. All of the other participants are on the videodisc. During the prosecutor's direct examination, improper questions will be asked. The witness will have improper information in some of the answers. The student must interrupt the trial at the proper occasions, otherwise the trial will not stop. After making the objection, the student will have to state the correct reason and the judge will pass a ruling on it. The trial will then resume at the proper point. The computer provides an analysis of the student's performance.

Hardware requirements:
IBM-PC computer
Pioneer LD-V1000 laserdisc player

Programed CAV
Software: supplied for IBM-PC
Center for Computer-Assisted Legal Instruction
Price: $450.00

MATHEMATICS

Infinity Factory
A series of 20 thirty-minute lessons (10 discs) for students between the ages of 8 and 12 to learn math in real life situations. This is geared for students in the Black and Latin communities. All programs are closed-captioned for the hearing-impaired.

Lesson Titles:
Percentages
Graphs
Decimal Fractions (1)
Approximation (1)
Measurement in Meters (1)
Angles
Averages
Fractions
Estimation of Length and Quantity
Estimation of Quantity and Length
Estimation of Weight and Volume
Measurement of Volume
Mapping and Scaling
Negative Numbers
Decimal Fractions (2)
Approximation (2)
Measurement in Meters (2)
Measurement of Time
Multiplication
Problem-Solving

Linear CAV
Software: not needed for linear programs
GPN
Price: $2,268 for ten discs and manual

Math Assessment
This is a bilingual math assessment videodisc for grade levels 1–3. It contains 335 criterion-referenced objectives presented in English or Spanish. Developed through Utah State University's videodisc research program, the disc can be used with or without an external computer. The package includes a math assessment videodisc, users manuals, record-keeping software, and support materials.

Hardware requirements:
(Optional External Program)
Allen Communications Interface
Apple II or IIe computer
Pioneer PR-7820, PR-8210, or VP-1000 videodisc player
(Internal Program)
Pioneer PR-7820–3 videodisc player (Epson printer optional)

Programed CAV
Software: provided for Apple II or IIe, or encoded on disc
Systems Impact, Inc.
Price: $295 with diskettes, $195 for encoded disc

Math in Biology
This program combines a videodisc and a microcomputer to provide interactive basic math instruction. The target groups for the instruction are women and minorities who seek a career in the life and health sciences, but have inadequate math skills. It is applicable to others as well. Biology examples are used throughout.

Programed CAV
Software: provided
University of Washington
Price: $450

Trigland
Trigland is an experimental interactive microcomputer/videodisc course in trigonometry. It is designed for schools that are unable to offer a conventional trigonometry course. It is intended to be used by small numbers of students, preferably one or two at a time. A math teacher should closely monitor the students' progress, give additional instruction when needed, and provide supplemental materials to reinforce the topics discussed in the Trigland modules. Progress quizzes are provided for each module to help the teacher determine areas of weakness and strength. The course consists of two videodiscs and 15 computer diskettes containing 12 modules of instruction.

Module Topics:
1. Introduction
2. Concepts of Relation and Function
3. Circular Functions
4. Degrees and Radians
5. Sine and Cosine Functions
6. Tangent and Reciprocal Functions
7. Basic Identities
8. Trigonometric Ratios, Interpolation and the Law of Sines and the Law of Cosines

9. Amplitude, Period, Phase and Vertical Shift and Addition of Ordinates
10. Uniform Circular Motion, Periodic Motion and Simple Harmonic Motion
11. Inverse Functions
12. Solution of Simple Linear and Quadratic Equations Involving Circular Functions, and Equations Containing More Than One Circular Function.

Necessary Hardware:
Apple II, II+, IIe with 48K and two disc drives
Two color monitors
One Pioneer VP-1000 or equivalent
One M.E.C.C. videodisc interface board (included with the course)
Pocket calculator with trigonometric functions or a table of trigonometric values.

Programed CAV
Software: provided for Apple II, II+, or IIe
Ortonville Public Schools
Price: $300

MEDICINE—CIRCULATORY SYSTEM

The Interactive CPR Learning System
This disc was originally developed by the American Heart Association as a means of significantly increasing the number of persons trained in cardiopulminary resuscitation by providing a high-quality, standardized course that does not require an increased number of instructors. The technology includes a microcomputer interfaced with a videodisc player, an interactive audiocassette player, and a CPR manikin wired with a series of electronic sensors. The learning theory is based on the premise that student performance is improved by immediate feedback that can pinpoint the student's mistakes as they occur. As the student interacts with the manikin, the system provides four different types of feedback: (1) audiovisual coaching using videodisc action segments selected by the computer; (2) visual display on the computer monitor (indicating, for example, that hand placement is incorrect or depth of compression is too shallow); (3) audio tones to indicate the proper timing of each compression; and (4) a graphic summary on the computer monitor that details overall performance. An individual student with some medical background may be able to complete the CPR course in two hours. A group of four students utilizing one system may require as little as four hours to finish the program. Recertification may require less than one hour.

Hardware requirements:
The hardware and software are only sold as a complete package with everything included. An infant manikin is optional.

Programed CAV
Software: supplied with entire system
Actronics Inc.
Prices:
$20,000 for entire package
$2,500 for optional infant manikin

How Your Heart and Circulatory System Works
This videodisc is designed to teach children 10 to 17 years old about the structure of the heart, the function of the blood, how to monitor heart rate and take blood pressure, and understanding diseases and disorders of the heart and blood vessels. Each disc is accompanied by a 110-page operator's manual. This manual explains how to use the automatic and manual mode to arrange and locate materials. The manual also describes and lists locations of motion scenes, slide, and print material for each of the six chapters on the videodisc.

Hardware requirements:
Pioneer PR-7820 or LD-V600 for programed use

Programed CAV
Software: Level Two encoded on disc
Simon Fraser University
Price: $100

MEDICINE—HEMATOLOGY

Medical Applications Videodisc: Hematology
This disc is a collaborative effort of the American Society of Hematology, the Western University Physical Diagnosis Slide Bank, the World Health Organization, and the University of Washington Health Sciences Center for Educational Resources. By referring to the accompanying catalog of the disc contents, the user may rapidly and accurately locate any frame of the disc. The disc may be utilized with either a syllabus or an external computer source (microcomputer to full mainframe) to develop a variety of computer-assisted lessons, tests, or case simulations. This one-sided videodisc contains the following:

1. The entire American Society of Hematology morphology collection (approximately 2200 frames)
2. The World Health Organization International Histologic Classification of Tumors (approximately 2500 frames)
3. Selected frames from the Western Universities Physical Diagnosis Slide Bank (approximately 2000 frames)

4. The film "Red Cell Shapes" by Professor Marcel Bessis. The short technique videotape "Venipuncture: The Vacutainer System" by Joyce Behrens, M.T. (ASCP)
6. A short demonstration program introducing the applications for the disc

Interactive CAV
Software: none needed for Level One applications
American Technology Resources
Price: $250

MEDICINE—MICROSCOPY

Clinical Microscopy
This one-sided disc contains materials from approximately 200 different clinical cases. It includes material in hematology, pathology, cytology, histology, parisitology, and microbiology. Scans of the material at various microscopic features of the case in question. The accompanying catalog allows generation of a wide variety of instructional programs utilizing either syllabi or computer (including microcomputer) control.

Interactive CAV
Software: not needed for Level One applications.
American Technology Resources
Price: $250

MEDICINE—NERVOUS SYSTEM

Disorders of the Nervous System: Motor
This one-sided disc is a compilation of material from a visual glossary collection of neurological dysfunction. Normal and abnormal gaits and reflexes are demonstrated as well as a wide variety of motor signs and disorders. The accompanying catalog allows rapid access for lecture demonstration or self-study as well as the compilation of written or computerized instructional programs.

Interactive CAV
Software:
American Technology Resources
Price: $175

Disorders of the Nervous System: Mentation
This one-sided disc is a compilation of material from a visual glossary collection of neurological dysfunction. Six patients are shown who demonstrate a variety of disorders of mentation. The accompanying catalog allows rapid access for lecture demonstration or self-study as well as the compilation of written or computerized instructional programs.

Interactive CAV
Software:
American Technology Resources
Price: $175

MEDICINE—TRAUMA TRAINING

Trauma Training Materials Videodisc
The University of Washington Department of Surgery and the HSCER developed this program of two discs (three sides) that demonstrates basic techniques that must be mastered by a trauma care team working in an emergency room setting. Each side covers two topics including interactive testing segments on each topic. Topics include: Approach to the Critically Injured Patient; Chest Tube Placement; Subclavian Catheterization; Peritoneal Lavage; Venous Cannulation, and Arterial Puncture.

Hardware Requirements:
Pioneer PR-7820 or LD-V6000 videodisc player is needed for interactive testing segments. The disc may be used without the testing segments on any laser disc player.

Programed CAV
Software: Level Two testing segments encoded on disc
American Technology Resources
Price: $225

MEDICINE—ULTRASOUND

Sight Through Sound: An Interactive Introduction to Medical Diagnostic Ultrasound
This one-sided disc covers the basic concepts and practice of ultrasound from principles of physics to the use of equipment and accurate interpretation of sonographic images. Viewers benefit from an interactive learning games approach providing valuable feedback on short case histories, identification of sonograms for clinical applications, recognizing transducer motion, and more. Viewers can actually manipulate simulated ultrasound scanner controls while watching the results of their actions on the video monitor.

Hardware Requirements:
Pioneer PR-7820 or LD-V6000 player needed for interactive program.

Programed CAV
Software: Level Two encoded on disc
American Technology Resources
Price: $495

MEDICINE—UROLOGY

Urinary Catheterization
This disc demonstrates the correct procedures for all aspects of preparing the equipment and the patient (male and female) for urinary catheterization. The disc also demonstrates the proper catheterization techniques for both male and female patients. The disc includes both instructional and testing features. The videodisc, including a manual, is available to accredited educational and health care institutions.

Hardware Requirements:
The system has program dumps on the disc and is designed to be used with a Sony LDP-1000 videodisc player.

Programed CAV
Software: Level Two program on the videodisc
ACCESS Alberta
Price: $225 including manual

MUSIC—INSTRUCTION

Videodisc Music Series, Disc 1
This four-disc series was designed and produced by the University of Delaware under a grant from the National Endowment for the Humanities. Each disc side contains a supporting slide library.

Side 1. Symphonic and Chamber Music
Joseph Haydn, "Symphony No. 94 (Surprise)," 2nd movement. University of Michigan Orchestra.
- Stereo audio performance
- Two-line score with harmonic reduction and analysis

W. A. Mozart, "Quintet for Clarinet and Strings" K.581, first movement. Delos String Quartet with Peter Hill.
- Full video performance with stereo sound
- Full score with harmonic analysis
- Melodic contour map

Side 2. Chamber Music
W. A. Mozart, "Piano Concerto in G Major K.453," 1st movement. Ars Musica with Penelope Crawford.
- Full video performance with stereo sound
- Performance on period instruments
- Two of Mozart's cadenzas
- Reduced four-line score

Interactive CAV
Software: not needed for Level One applications
University of Delaware
Price: $295 for four discs and manual

Videodisc Music Series, Disc 2
This four-disc series was designed and produced by the University of Delaware under a grant from the National Endowment for the Humanities. Each disc side contains a supporting slide library.

Side 1. Symphonic Program Music
Hector Berlioz. "Symphonie Fantastique," 5th movement. Oberlin Conservatory Orchestra.
- Full video performance with stereo sound
- Reduced Score
- Statements of the Idee Fixe from all movements

Gregorian Chant, "Dies Irae." Catholic University
- Full video performance with stereo sound
- Rhythmic analysis of the chant statements in the Symphonie Fantastique

Side 2. Orchestral Program Music
Claude Debussy, "Prelude to the Afternoon of a Faun." Oberlin Conservatory Orchestra.
- Stereo audio performance
- Reduced two-line score

Orchestral Instrument Demonstrations
- Video examples with stereo sound
- Video spectrum analysis of selected instruments

Interactive CAV
Software: not needed for Level One applications
University of Delaware
Price: $295 for four discs and manual

Videodisc Music Series, Disc 3
This four-disc series was designed and produced by the University of Delaware under a grant from the National Endowment for the Humanities. Each disc side contains a supporting slide library.

Side 1. Vocal Music
Karl Loewe, J. F. Reichardt, Franz Schubert, "Erlkonig." Curtis Institute of Music.
- Full video performances for all three settings
- Full score of the Schubert with harmonic analysis
- Full audio performance of the Schubert in English

Johannes Brahms "Shaffe in Mir Gott," from the 51st Psalm. Oberlin Conservatory Chorus.
- Full audio performance in stereo
- Full score with color-coded form analysis

Side 2. Opera
Giacomo Puccini, "La Boheme," selected scenes. Met-

ropolitan Opera, directed by Franco Zeffirelli.
- Video performances of selected scenes from the opera
- Franco Zeffirelli's views on singers/actors
- Rehearsal sequences of the opera
- Excerpts from the soon-to-be-released disc by the Met

Interactive CAV
Software: not needed for Level One applications
University of Delaware
Price: $295 for four discs and manual

Videodisc Music Series, Disc 4
This four-disc series was designed and produced by the University of Delaware under a grant from the National Endowment for the Humanities. Each disc side contains a supporting slide library.

Side 1. Keyboard Works
Carl Phillipp Emanuel Bach, "Fantasia in G Minor." James Weaver, Smithsonian Institution.
- Full performances on clavichord and fortepiano
- Full score with harmonic reduction and analysis
- Demonstration of period keyboard ornaments

Ludwig van Beethoven, "Piano Sonata Opus 13 (Pathetique)." Michael Steinberg, University of Delaware.
- Full video performance in stereo
- Full score with harmonic reduction and analysis
- Color-coded formal analysis

Side 2. Keyboard Works
Frederic Chopin, "Polonaise, Opus 53." Leon Bates, University of Delaware.
- Full video performance in stereo
- Full score with harmonic reduction
- Full score with color-coded formal analysis

Interactive CAV
Software: not needed for Level One applications
University of Delaware
Price: $295 for four discs and manual

Music Is
This course is geared for upper elementary level music classes. The course consists of five discs with a 30-minute lesson on each side. The instruction is based on a linear play format, so there is no interactivity built into the course. The disc is also equipped for closed captions.

1. Music Is
2. Music Is Rhythm
3. Music Is Melody
4. Music Is Harmony
5. Music Is Tone Color
6. Music Is Form
7. Music Is Composed
8. Music Is Conducted
9. Music Is Improvised
10. Music Is Style

Linear CAV
No Computer Program Available
GPN
Price: $1,134 with teacher's guide

MUSIC—JAZZ

Nat Adderly, Jazz Life Volume 3
Songs include "Work Song," "Tallahassie," "Chelsea Bridge," "Jordanian Walk," and "The Scene." Recorded live at the Village Vanguard. 55 minutes.

Pioneer Video
Linear CAV
Price: $29.95

Art Blakely
With Wynton Marsalis live at 7th Avenue South, December 21, 1981. Songs include "MS.BC," "My Ship," "Fuller Love," "Alicia" and "Gypsy Folktales." 54 minutes.

Pioneer Video
Linear CAV
Price: $29.95

Richie Cole, Jazz Life Volume 1
Recorded June 1981 at the Village Vangard in New York. "Punishment Blues," "Yardbird Suite," "Island Breeze," and "Body and Soul." 51 minutes.

Pioneer Video
Linear CAV
Price: $29.95

Chick Corea
Songs include "L's Bop," "Why Wait," "3,500 Miles High," and "Guernica." 57 minutes.

Pioneer Video
Linear CLV
Price: $38.95

Chick Corea and Gary Burton, Crystal Break
Pioneer Video
Linear CLV
Price: $24.95

Chick Corea and Gary Burton Live in Tokyo
Songs include "La Fiesta," "Senor Mouse," and children's songs. 58 minutes.

Pioneer Video, Catalog # PA-83-037
Linear CLV
Price: $24.95

George Duke, Super Keyboards
Pioneer Video
Linear CLV
Price: $34.95

Ella Fitzgerald
Recorded with Paul Smith Trio and All Stars. Songs include "Night and Day," "Honeysuckle Rose," "Old MacDonald," and "Georgia on My Mind." 59 minutes.

Pioneer Video
Linear CLV
Price: $29.95

Dizzy Gillespie and the All-Star Dreamband
With Gerry Mulligan, Max Roach, Paul West, John Lewis, Milt Jackson, and others. Recorded on February 16, 1982. 90 minutes.

Pioneer Video
Linear CLV
Price: $44.95

Dizzy Gillespie, Live at Concerts by the Sea
Recorded on February 26, 1981. Songs include "Be Bop," "Hard of Hearing," "Mama," and "Jazz America."

Pioneer Video
Linear CLV
Price: $29.95

Johnny Griffen, Jazz Life Volume 2
Songs include "Blues for Gonzi," "56," "A Monks Dream," and "Blues for Lesley." Recorded in June of 1981 at the Village Vanguard in New York. 47 minutes.

Pioneer Video
Linear CAV
Price: $29.95

Freddie Hubbard Live at the Village Vanguard
Songs include "Happy Times," "Guernica," "Litte Waltz," "Fantasy in D." Recorded on June 24, 1982. 55 minutes.

Pioneer Video
Linear CLV
Price: $29.95

Jazz on a Summer's Day
Louis Armstrong, Thelonius Monk, Sonny Stitt, George Shearing, Dinah Washington, Gerry Mulligan, Chico Hamilton, Anita O'Day, Jimmy Guiffre, Chuck Berry, Big Mybelle Smith, Jack Teagarden, and Mahalia Jackson.

Pioneer Video
Linear CLV
Price: $52.95

Jazz Vocal Special
Rare footage of 1950s television shows including Anita O'Day, Nat King Cole, Louis Armstrong, Cab Calloway, and Helen O'Connell. Songs include "Man That's Groovy," "Got a Penny Benny," "Lonesome Road," "Five Guys Named Mop," and "Thanks for the Boogie Ride." 40 minutes, B&W. Monoral sound.

Pioneer Video
Linear CLV
Price: $38.95

Keith Jarrett, Vermont Solo Concert 1977
Pioneer Video
Linear CLV
Price: $41.95

George Kawaguchi Meets Shelly Manne
Songs include "Old Man," "Sand Storm," "Windy Afternoon," "Traditional," and "Bear Walk."

Pioneer Video
Linear CAV
Price: $29.95

Manhattan Express
Mike Mainieri with Bob Minzer on electric bass clarinet. Recorded in December 1981 at Seventh Avenue

South, New York. Songs include "I'm Sorry," "Flying Colors," "Crossed Wires," and "Bamboo." 50 minutes.

Pioneer Video
Linear CAV
Price: $29.95

Modern Jazz Quartet, Again
Songs include "The Cylinder," "Summertime," "Monterey Mist," and "Confirmation." Recorded in concert October 20, 1981 at the Tokyo Budokan. 79 minutes.

Pioneer Video
Linear CLV
Price: $34.95

Music in Monk Time
Chick Corea and others pay a musical tribute to the late Thelonius Sphere Monk's compositions including 10 selections. 60 minutes.

Pioneer Video
Linear CLV
Price: $38.95

Gerry Mulligan, Live at ERIC
Songs include "17 Mile Drive," "For an Unfinished Woman," "Walk on Water," "North Atlantic Run," and "K-4 Pacific." Recorded on February 26, 1981. 59 minutes.

Pioneer Video
Linear CLV
Price: $29.95

One Night Stand
Eubie Blake, Kenny Barron in duet with Bobby Hutcherson, Bob James, and others. 1981, 98 minutes.

Pioneer Video, Catalog # 7044–80
Linear CLV
Price: $29.98

Oscar Peterson
Songs include "City Lights," "On Danish Shores," "Yesterday," and "My Shining Hour." 56 minutes.

Pioneer Video
Linear CLV
Price: $29.95

Playboy Jazz Festival Volume 1
Willie Bobo, Art Farmer, Maynard Furguson, McCoy Tyner, Elvin Jones, Lionel Hampton, Red Norvo and Grover Washington. 90 minutes.

Pioneer Video
Linear CLV
Price: $41.95

Playboy Jazz Festival Volume 2
Dave Brubeck, Ornette Coleman, Weather Report, Manhattan Transfer. 90 minutes.

Pioneer Video
Linear CLV
Price: $41.95

Max Roach Live at Blues Alley
Songs include "Mr. High Hat," "Big Sid," "It's Time," and "Back to Basics." Recorded on March 2, 1981. 59 minutes.

Pioneer Video
Linear CLV
Price: $29.95

Sonny Rollins, Montreal 1982
Pioneer Video
Linear CLV
Price: $29.95

George Shearing at Ambassador Auditorium
Songs include "On a Clear Day," "High and Inside," "Close Enough for Love," "Up a Lazy River," "Concerto for Classical Guitar and Jazz Piano." George Shearing, piano; Angel Romero, guitar; Shelly Manne, drums; and Brian Torff, bass. 50 minutes.

Pioneer Video, Catalog # PA-82–022
Linear CAV
Price: $29.95

Mel Torme and Della Reese in Concert 1978
Pioneer Video, Catalog # 74–009
Linear CLV
Price: $24.95

Grover Washington, Jr. in Concert
With Eric Gale, Richard Tee, and Steve Gadd. Songs include "Just the Two of Us," "Winelight," and "Come Morning." 53 minutes.

Pioneer Video, Catalog # PA-82-011
Linear CAV
Price: $24.95

Nancy Wilson with the Chick Corea Band
Songs include "I Want To Be Happy," "I Get a Kick Out of You," "Round Midnight," "But Not for Me," "Yesterday," "Them There Eyes," "Take the A Train." 47 minutes.

Pioneer Video
Linear CLV
Price: $38.95

MUSIC—MUSICALS

An American in Paris
Gene Kelly, Leslie Caron. Music by George Gershwin. 1951, 102 minutes.

Pioneer Video, Catalog # ML100006
Linear CLV
Price: $34.95

Annie
Aileen Quinn, Ann Reinking, Geoffrey Holder, Carol Burnett, Albert Finney, Bernadette Peters, Tim Curry. Directed by John Huston. Music and lyrics by Charles Strouse and Martin Charnin. 1981.

Pioneer Video, Catalog # VLD1030
Linear CLV
Price: $39.95

Best Little Whorehouse in Texas
Dolly Parton, Burt Reynolds, Dom DeLuise, Charles Durning, Jim Nabors, Lois Nettleton. Directed by Colin Higgins. 1982, 114 minutes.

Pioneer Video, Catalog # 17–008
Linear CLV
Price: $34.98

Brigadoon
Gene Kelly, Van Johnson, Cyd Charisse. Directed by Vincente Minnelli. Music and lyrics by Frederick Loewe and Alan Jay Lerner. 1954, 108 minutes.

Pioneer Video, Catalog # ML100040
Linear CLV
Price: $34.95

Cabaret
Liza Minnelli, Michael York, Joel Grey. Directed by Bob Fosse. Music and lyrics by John Kander and Fred Ebb. 1972, 117 minutes.

Pioneer Video, Catalog # 7035–80
Linear CLV
Price: $34.98

Camelot
Richard Harris, Vanessa Redgrave, David Hemmings. Directed by Joshua Logan. Music and lyrics by Frederick Loewe and Alan Jay Lerner. 1967.

Pioneer Video, Catalog # 11084LV
Linear CLV
Price: $39.98

Fiddler on the Roof
Topol, Norma Crane, Molly Picon, Leonard Frey. Directed by Norman Jewison. Music and lyrics by Jerry Bock and Sheldon Harnick. 1971, 169 minutes.

Pioneer Video, Catalog # 4524–80
Linear CLV
Price: $49.98

Finian's Rainbow
Fred Astaire, Petula Clark, Keenan Wynn. Music and lyrics by Burton Lane and E. Y. Harburg. Directed by Francis Ford Coppola. 1968, 141 minutes.

Pioneer Video, Catalog # 11208LV
Linear CLV
Price: $39.98

42nd Street
Dick Powell, Ginger Rogers, Ruby Keeler, Bebe Daniels, Warner Baxter, Guy Kibbee, Una Merkel. Directed by Lloyd Bacon. Music and lyrics by Harry Warren and Al Dubin. 1933, 89 minutes. B&W

Pioneer Video, Catalog # 4502–80
Linear CLV
Price: $29.98

Funny Girl
Barbra Streisand, Kay Medford, Walter Pidgeon, Omar Sharif, Ann Francis. Directed by William Wyler. Music and lyrics by Jule Styne and Bob Merrill. 1968.

Pioneer Video, Catalog # VLD3155
Linear CLV
Price: $39.95

A Funny Thing Happened on the Way to the Forum
Zero Mostel, Phil Silvers, Jack Gifford, Buster Keaton. Directed by Richard Lester. Music and lyrics by Stephen Sondheim. 1966, 99 minutes.

Pioneer Video, Catalog # 418–80
Linear CLV
Price: $34.98

Gigi
Leslie Caron, Louis Jourdan, Maurice Chevalier, Hermione Gingold. Directed by Vincente Minnelli. Music and lyrics by Frederick Loewe and Alan Jay Lerner. 1958, 115 minutes.

Pioneer Video, Catalog # ML100050
Linear CLV
Price: $34.95

Grease
Olivia Newton-John, John Travolta, Stockard Channing, Eve Arden, Sha-Na-Na. Music and lyrics by Warren Casey and Jim Jacobs. 1977, 110 minutes.

Pioneer Video, Catalog # LV1108
Linear CLV
Price: $29.95

Grease II
Maxwell Caufield, Michelle Pfeiffer, Lorna Luft, Adrian Zmed, Didi Conn, Eve Arden, Sid Caesar, Tab Hunter. 1982, 115 minutes.

Pioneer Video, Catalog # LV1193
Linear CLV
Price: $29.95

Guys and Dolls
Frank Sinatra, Marlon Brando, Stubby Kay, Jean Simmons, Vivian Blaine, Sheldon Leonard. Directed by Joseph L. Mankiewicz. Music and lyrics by Frank Loesser. 1955, 150 minutes.

Pioneer Video, Catalog # 7039–80
Linear CLV
Price: $39.98

Hair
Treat Williams, John Savage, Beverly D'Angelo. Music by Galt MacDermot and lyrics by Gerome Ragni and James Rado. 1979, 119 minutes

Pioneer Video, Catalog # 4593
Linear CLV
Price: $34.98

Hello Dolly
Barbra Streisand, Walter Matthau, Michael Crawford, Louis Armstrong. Directed by Gene Kelly. Music and lyrics by Jerry Herman. 1969, 148 minutes.

Pioneer Video, Catalog # 1101–80
Linear CLV
Price: $39.98

The King and I
Deborah Kerr, Yul Brynner, Rita Moreno, Martin Benson. Music by Richard Rodgers and Oscar Hammerstein II. 1956, 133 minutes.

Pioneer Video, Catalog # 1004–80
Linear CLV
Price: $34.98

The Little Prince
Richard Kiley, Bob Fosse, Gene Wilder, Steven Warner. Directed by Stanley Donen. Music and lyrics by Frederick Loewe and Alan Jay Lerner. 1974, 88 minutes.

Pioneer Video, Catalog # LV8017
Linear CLV
Price: $29.95

Mame
Lucille Ball, Beatrice Arthur, Robert Preston. Music and lyrics by Jerry Herman. 1974, 131 minutes.

Pioneer Video, Catalog # 111000LV
Linear CLV
Price: $39.98

Mary Poppins
Julie Andrews, Dick Van Dyke, Glynis Johns, David Tomlinson. Directed by Robert Stevenson. Music and

lyrics by Richard M. Sherman and Robert B. Sherman. 1964, 139 minutes.

Pioneer Video, Catalog # 42023AS
Linear CLV
Price: $44.95

Meet Me in St. Louis
Judy Garland, Margaret O'Brien, Mary Astor, Tom Drake, June Lockhart, Harry Davenport. Directed by Vincent Minnelli. 1944, 115 minutes. B&W

Pioneer Video, Catalog # ML100005
Linear CLV
Price: $34.95

My Fair Lady
Audrey Hepburn, Rex Harrison, Stanley Holloway, Wilfred Hyde White, Gladys Cooper. Directed by George Cukor. Music and lyrics by Frederick Loewe and Alan Jay Lerner. 1964, 170 minutes.

Pioneer Video, Catalog # 7038–80
Linear CLV
Price: $39.98

Oklahoma
Shirley Jones, Gordon MacRae, Rod Steiger, Charlotte Greenwood, Gloria Grahame, Eddie Albert. Directed by Fred Zinnemann. Music and lyrics by Richard Rodgers and Oscar Hammerstein II. 1955.

Pioneer Video, Catalog # 7020–80
Linear CLV
Price: $39.98

On the Town
Frank Sinatra, Gene Kelly, Ann Miller. 98 minutes.
Pioneer Video, Catalog # ML100057
Linear CLV
Price: $34.95

Paint Your Wagon
Lee Marvin, Clint Eastwood, Jean Seberg, Harve Presnell. Directed by Joshua Logan. Music and lyrics by Frederick Loewe and Alan Jay Lerner. 1970, 164 minutes.

Pioneer Video, Catalog # LV6933–2
Linear CLV
Price: $35.95

Pippin
Ben Vereen, William Katt, Martha Raye, Chita Rivera. Music and lyrics by Stephen Schwartz. 1981, 110 minutes.

Pioneer Video, Catalog # PA-82–009
Linear CLV
Price: $34.95

Singing in the Rain
Gene Kelly, Debbie Reynolds, Donald O'Connor, Jean Hagen, Rita Moreno, Cyd Charisse. Directed by Stanley Donen. Music and lyrics by Arthur Freed and Nacio Herb Brown. 1952, 103 minutes.

Pioneer Video, Catalog # ML100185
Linear CLV
Price: $35.95

Sound of Music
Julie Andrews, Christopher Plummer. Directed by Robert Wise. Music and lyrics by Richard Rodgers and Oscar Hammerstein II. 1965, 174 minutes.

Pioneer Video, Catalog # 1051–80
Linear CLV
Price: $49.98

South Pacific
Rossano Brazzi, Mitzi Gaynor, Ray Walston, France Nuyen. Music and lyrics by Richard Rodgers and Oscar Hammerstein II. 1958, 150 minutes.

Pioneer Video, Catalog # 7045–80
Linear CLV
Price: $39.98

Tommy
Ann-Margaret, Oliver Reed, Jack Nicholson, Elton John, Tina Turner, Roger Daltrey, Eric Clapton, Keith Moon. Directed by Ken Russell. Music and lyrics by Peter Townsend. 1975.

Pioneer Video, Catalog # VLD5951
Linear CLV
Price: $29.95

Treasure Island, The Musical
Christopher Cazenove, Frank Gorshin, Bernard Miles. Music by Cyril Ornadel, lyrics by Hal Shaper. 118 minutes.

Pioneer Video, Catalog # PA-83–062
Linear CLV
Price: $24.95

West Side Story
Natalie Wood, Richard Beymer, Rus Tamblyn, Rita Moreno, George Chakiris. Directed by Robert Wise and Jerome Robbins. Music and lyrics by Leonard Bernstein and Stephen Sondheim. 1961, 150 minutes.

Pioneer Video, Catalog # 4519–80
Linear CLV
Price: $39.98

The Wiz
Diana Ross, Michael Jackson, Nipsey Russell, Ted Ross, Mabel King, Thelma Carpenter. Music and lyrics by Charlie Small. 1978, 134 minutes.

Pioneer Video, Catalog # 17–005
Linear CLV
Price: $29.95

The Wizard of Oz
Judy Garland, Frank Morgan, Ray Bolger, Burt Lahr, Jack Haley. Directed by Victor Fleming. 1939, 101 minutes.

Pioneer Video, Catalog # ML100001
Linear CLV
Price: $34.95

Xanadu
Olivia Newton-John, Gene Kelly, Michael Beck. 1980, 97 minutes.

Pioneer Video, Catalog # 17–006
Linear CLV
Price: $29.95

Yankee Doodle Dandy
James Cagney, Joan Leslie, Walter Huston, Richard Whorf. Directed by Michael Curtiz. Music by George M. Cohan. 1943, 126 minutes. B&W

Pioneer Video, Catalog # 4513–80
Linear CLV
Price: $39.98

MUSIC—OPERA

Aida
By Giuseppi Verdi. Maria Chiara, Nicola Martinucci, Fiorenza Cossotto, Giuseppe Scandola. Performed at the Arena di Verona on July 31, 1984, Anton Guadagno conducting. 154 minutes.

Pioneer Video, Catalog # PA-82–017
Linear CLV
Price: $59.95

Der Freischutz
By Karl Maria von Weber. Dresden State Orchestra and Chorus. Rolf Haunstein, Rolf Wolfrad, Ana Pisar, Christine Weidinger, Karl-Heinz Stryczek, Reiner Goldberg, Rolf Tomaszewski, and Gunter Leib with Siegfried Krutz conducting. 135 minutes.

Pioneer Video
Linear CLV
Price: $41.95

Die Fledermaus
By Richard Strauss. Royal Opera House, Covent Garden. Kiri te Kanawa, Hildegarde Heichele, Dennis O'Neill, Hermann Prey. Conducted by Placido Domingo. 180 minutes.

Pioneer Video
Linear CLV
Price: $37.50

Don Carlo
By Giuseppi Verdi. Performed at the Metropolitan Opera conducted by James Levine. Placido Domingo, Mirella Freni, Grace Bumbry, Louis Quilico, Nicolai Ghiaurov. March 26, 1983. 214 minutes.

Pioneer Video
Linear CLV
Price: $49.95

Ernani
By Giuseppi Verdi. Teatro Alla Scala. Placido Domingo, Mirella Freni, Renato Bruson, Nicolai Ghiavrov. 138 min.

Pioneer Video, Catalog # PA-83-060
Linear CLV
Price: $49.95

Falstaff
By Giuseppi Verdi. Royal Opera House, Covent Gardens. Renato Bruson Katia Ricciarelli, Leo Nucci, Barbara Hendricks. Conducted by Carlo Maria Giulini. 1982, 139 minutes.

Pioneer Video, Catalog # PA-84-064
Linear CLV
Price: $49.95

H. M. S. Pinafore
By Gilbert & Sullivan. Peter Marshall, Frankie Howard, Meryl Drower, Michael Bulman. 90 min.

Pioneer Video, Catalog # PA-84-067
Linear CLV
Price: $24.95

La Boheme
By Giacomo Puccini. Royal Opera House, Covent Garden. Ileana Cotrubas and Neil Shicoff. February 16, 1982. 116 min.

Pioneer Video, Catalog # PA-82-028
Linear CLV
Price: $49.95

La Fanciulla del West
By Giacomo Puccini. Royal Opera House, Covent Garden. Placido Domingo, Carol Neblett, and Silvano Carroli. 1982, 140 min.

Pioneer Video, Catalog # PA-83-056
Linear CLV
Price: $49.95

La Traviata
By Giuseppi Verdi. Franco Zefferelli, director. Placido Domingo, Theresa Stratas, Cornell MacNeil, Alan Monk, Axelle Gall, Pina Cei, with English subtitles. 1983, 105 minutes. Surround sound encoded.

Pioneer Video
Linear CLV
Price: $29.98

Lucia di Lammermoor
By Gaetano Donizetti. Metropolitan Opera conducted by Richard Boyge. Joan Sutherland, Alfredo Kraus, Pablo Elvira, Ariel Bybee. 128 minutes.

Pioneer Video
Linear CLV
Price: $49.95

Manon Lescaut
By Giacomo Puccini. Royal Opera House, Covent Garden. Placido Domingo, Kiri te Kanawa. Giuseppi Sinopoli conducting.

Pioneer Video
Linear CLV
Price: $44.95

Mikado
By Gilbert & Sullivan. Clive Revill, William Conrad, Stafford Dean, Gordon Sandison and Kate Flowers. Staged by Michael Geliot and Directed by Rodney Greenburg with the London Symphony Orchestra, Alexander Faris conducting. 113 min. 1982.

Pioneer Video, Catalog # PA-83-061
Linear CLV
Price: $24.95

Otello
By Giuseppi Verdi. Arena de Verona. Vladimir Atlantov, Kiri te Kanawa, and Piero Cappucelli. 1982, 144 minutes.

Pioneer Video, Catalog # PA-83-054
Linear CLV
Price: $49.95

Peter Grimes
By Benjamin Britten. Royal Opera House, Covent Garden. Jon Vickers. 150 minutes.

Pioneer Video, Catalog # PA-82-008
Linear CLV
Price: $59.95

Pirates of Penzance
By Gilbert & Sullivan. Peter Allen, Keith Michell, Gillian Knight, Alexander Oliver, and Janis Kelly. Staged by Michael Geliot and directed by Rodney Greenburg

with the London Symphony Orchestra, Alexander Faris conducting. 94 min. 1982.

Pioneer Video, Catalog # PA-83–059
Linear CLV
Price: $24.95

Samson and Dalila
By Camille Saint Saens. Royal Opera House, Covent Garden. Jon Vickers and Shirley Verrett. 118 minutes.

Pioneer Video, Catalog # PA-82–014
Linear CLV
Price: $59.95

Tales of Hoffman
By Jacques Offenbach. Royal Opera House, Covent Garden. Placido Domingo, Luciana Serra, Agnes Baltsa, Ileana Cotrubas. 159 minutes.

Pioneer Video, Catalog # PA-81–006
Linear CLV
Price: $59.95

Un Ballo in Maschera
By Giuseppi Verdi. Metropolitan Opera House Production with Luciano Pavarotti, conducted by Giuseppe Patane. 1980.

Pioneer Video
Linear CLV
Price: $37.50

Yeoman of the Guard
By Gilbert & Sullivan. Joel Grey

Pioneer Video
Linear CLV
Price: $24.95

MUSIC—ORCHESTRAL (*Denotes multiple selections on disc)

Bach, J. S.
Vier Ouverturen (Orchestersuiten)
Kammerorchester Berlin, Helmut Koch, conducting. Ballet sequences by Leipzig Opera Company Ballet Troupe. 79 minutes.

Pioneer Video, Catalog # MC-065
Linear CLV
Price: $28.95

Beethoven, Ludwig von
***Symphony No. 3 in E flat major** Op.55 (Eroica)
NHK Symphony Orchestra, Otmar Suitner, conducting. 52 minutes. Recorded in November 1980.

Pioneer Video, Catalog # MC-051
Linear CLV
Price: $29.95

Beethoven, Ludwig von
***Symphony No. 5 in C minor** Op.67 (Fate)
Staatskapelle Berlin, Otmar Suitner, conducting. Recorded June 7, 1981, in Japan.

Pioneer Video, Catalog # MC-044
Linear CLV
Price: $34.95

Beethoven, Ludwig von
Symphony No. 6 in F major Op.68 (Pastorale)
NHK Symphony Orchestra, Otmar Suitner, conducting. Recorded in November 1980. 46 minutes.

Pioneer Video, Catalog # MC-053
Linear CAV
Price: $29.95

Beethoven, Ludwig von
Symphony No. 9 in D minor
Wolfgang Sawallisch, conducting the Czechoslovakia Philharmonic Orchestra. Recorded in June 1981. 71 minutes.

Pioneer Video, Catalog # MC-035
Linear CLV
Price: $34.95

Beethoven, Ludwig von
***Egmont Overture**
Staatskapelle Berlin, Otmar Suitner conducting.

Pioneer Video, Catalog # MC-044
Linear CLV
Price: $32.95

Beethoven, Ludwig von
***Leonore Overture No. 3** from Op.72
Staatskapelle Berlin, Otmar Suitner, conducting. Recorded June 7, 1981, in Japan.

Pioneer Video, Catalog # MC-044
Linear CLV
Price: $34.95

Bruckner, Anton
***Symphony No. 4 in E flat major** (Romantic)
Staatskapelle Dresden, Herbert Blomstedt, conducting. Recorded in July 1981.

Pioneer Video, Catalog # MC-045
Linear CLV
Price: $32.95

Dvorak, Antonin
Slavic Dances
Zdenek Kosler, conducting. 71 minutes.

Pioneer Video, Catalog # MC-037US
Interactive CAV
Price: $29.95

Dvorak, Antonin
Symphony No. 9 in E minor Op.95 (New World)
Czech Philharmonic Orchestra, Vaclav Neumann, conducting.

Pioneer Video, Catalog # MC-036
Linear CLV
Price: $27.95

Dvorak, Antonin
Symphony No. 9 in E minor Op.95 (New World)
NHK Symphony Orchestra, Otmar Sawallisch conducting. 46 Recorded in April 1980. 46 minutes.

Pioneer Video, Catalog # MC-052
Interactive CAV
Price: $28.95

Mozart, Wolfgang Amadeus
***Symphony No. 35 in D major** K.285 (Hafner)
Staatskapelle Berlin, Otmar Suitner conducting.

Pioneer Video, Catalog # MC-044
Linear CLV
Price: $32.95

Schubert, Franz
***Symphony No. 8 in B minor** (Unfinished)
Staatskapelle Dresden, Herbert Blomstedt conducting.

Pioneer Video, Catalog # MC-045
Linear CLV
Price: $32.95

Smetana, Bedrich
My Fatherland (Ma Vlast)
Czech Philharmonic Orchestra, Vaclav Neumann conducting.

Pioneer Video, Catalog # MC-034
Linear CLV
Price: $29.95

Stravinsky, Igor
The Soldier's Tale (L'Histoire du Soldat)
This is an animated version of the Stravinsky work by R. O. Blechman who is a noted cartoonist for the New Yorker magazine. It features voices of Max Von Sydow, Dusan Makavejew, and Andre Gregory. Music is performed by the Los Angeles Chamber Orchestra conducted by Gerard Schwarz. 56 minutes.

Pioneer Video
Linear CLV
Price: $31.45

MUSIC—SOLO/ENSEMBLE

Ayako, Nakamura
Nakamura Ayako on piano performing *Pictures at an Exhibition* by Modest Mussorgsky.

Pioneer Video
Interactive CAV
Price: $29.95

Chuchro, Josef
Josef Chuchro performing the *Cello Concerto in B flat* Op.104 by Antonin Dvorak. Vaclav Neumann conducting the Czechoslovakian Philharmonic.

Pioneer Video
Interactive CAV
Price: $29.95

Horowitz, Vladimir
Horowitz in London, Royal Opera House, June 1983. Includes Chopin, Scarlotti Sonatas, Schumann's *Scenes from Childhood*, and Rachmaninoff. 116 minutes.

Pioneer Video, Catalog # PA-82–031
Linear CLV
Price: $29.95

Pavarotti, Luciano
Pavarotti in London, Royal Albert Hall, April 13, 1982. Royal Philharmonic Orchestra. Includes arias from *Tosca, Macbeth, L'Elisir d'Amore,* and *Turandot.* 51 minutes.

Pioneer Video, Catalog # PA-83–043
Linear CLV
Price: $29.95

Perlman, Itzhak
Itzhak Perlman with the Philharmonic Orchestra, Carlo Maria Giulini conducting. Beethoven *Violin Concerto*. 45 minutes.

Pioneer Video, Catalog # PA-83–042
Linear CLV
Price: $24.95

Rostropovich, Mstislav
Rostropovich performing Dvorak *Cello Concerto* and Saint-Saenes *Cello Concerto #1*. London Philharmonic Orchestra, Carlo Maria Giulini conducting. 65 minutes.

Pioneer Video, Catalog # PA-82–024
Linear CLV
Price: $24.95

The Met Gala
The 100th anniversary concert at the Metropolitan Opera House features close to one hundred of the world's leading singers, seven conductors, the Met Orchestra, Chorus and Ballet performing in two separate programs. The Met Gala recalls some of the most brilliant arias and ensembles of the repertory, performed against a backdrop of five Met productions. 1983.

Pioneer Video
Linear CLV
Price: $49.95

PHOTOGRAPHY

The Creative Camera
This is a participative disc that enables one to learn more about 35 mm single lens reflex (SLR) cameras. It describes technical terms and techniques and reviews the do's and don'ts of good photography. Audio track #1 features instructions for the beginner, audio track #2 is for the more advanced photographer.

1. The Camera
2. The Lens
3. Film
4. Light
5. Exposure
6. Accessories
7. Photographing People
8. Photographing Sports and Action
9. Photographing Scenics and Travel
10. Special Effects

Five photo assignments include glamour, San Francisco houses, vintage cars, wildflowers, and rodeo.

Interactive CAV
Software: not needed for Level One applications
Pioneer Video, Catalog # HP-019
Price: $29.95

PHYSICAL EDUCATION—SELF-DEFENSE

The World of Martial Arts
This is a complete course on two levels. Audio track one provides explicit instructions to the moves shown on the screen, while audio track two contains more advanced information. Many of the world's foremost practitioners are teachers on this disc. An added feature is the philosophy behind the Al Thomas system of Budojujutsu.

Interactive CAV
Software: none needed in Level One applications
Pioneer Video, Catalog # 37–605
Price: $29.95

PHYSICAL FITNESS—EXERCISE

Aerobicise: The Beginning Workout
1982, 96 minutes.

Pioneer Video, Catalog # LV2312
Linear CLV
Price: $29.95

Aerobicise: The Beautiful Workout
Loryanna Catalano, Deborah Corday, Tina Rocca. 113 minutes.

Pioneer Video, Catalog # LV2308
Linear CLV
Price: $29.95

Aerobicise: The Ultimate Workout
Two self-contained classes. 1982, 105 minutes.

Pioneer Video
Linear CAV
Price: $29.95

Jazzercise
Judi Sheppard Missett is the instructor for this disc that uses many styles of popular music to exercise to. The disc allows the user to set a routine that is suited to individual needs. The disc uses the dual audio capabilities of the laser disc.

Pioneer Video, Catalog # 32-608
Linear CAV
Price: $24.95

Muscle Motion
Featuring the men of Chippendales. 1983, 57 minutes.

Pioneer Video, Catalog # PA-83-049
Linear CAV
Price: $24.95

PHYSICAL FITNESS—RELAXATION AND RUNNING

Jim Fixx on Running
Tips on all aspects of running are contained on this disc, hosted by Jim Fixx. 53 minutes.

Pioneer Video, Catalog # 32-007
Linear CLV
Price: $24.95

The Joy of Relaxation
The disc contains two complete relaxation routines—one for indoors and one for outdoor environments. Step-by-step instructions teach the user how to relax.

Pioneer Video, Catalog # 37-604
Linear CAV
Price: $29.95

Yoga Moves with Alan Finger
A complete workout with Alan Finger for rejuvenating the mind and body. 59 minutes.

Pioneer Video, Catalog # 30-002
Linear CLV
Price: $29.95

SCIENCE—ANTHROPOLOGY

Ninety-Six: A Cattle Ranch in Northern Nevada
This disc describes the operation of a beef cattle ranch in Humbolt County, Nevada. It is interactive on side A and linear on side B. Includes footage from 1979–1981 with some footage from 1945. The disc comes with a booklet that is geared to college level anthropology or folklore courses.

Hardware Requirements:
Pioneer PR-7820-3 player.

Programed CAV
Software: Level Two encoded on disc
Library of Congress
Price: $100

SCIENCE INSTRUCTION—BIOLOGY

Bio Sci
This disc is a generic videodisc with a slide bank of over 6,000 color images covering many areas of biology. An image directory assists in quickly locating a given image. Areas covered include protozoology, histology, invertebrate zoology, plant taxonomy, entomology, ecology, icthyology, cell biology, herpetology, developmental biology, ornithology, biochemistry, mammalogy.

Software Packages (as of March 1, 1984)
1. Protein synthesis, predator-prey, Mendalian genetics, and fertilization and development.
2. Adaptive illusion, invertebrates, insects, amphibians, arthropods, reptiles.
3. Steppe biome, wet coniferous forest biome, Mt. St. Helens, plant diversity.
4. Gymnosperms, fungi, angiosperms.
5. Reptiles, birds, animal diversity, fishes, mammals.

Programed CAV
Software: written for Apple II and IBM-PC jr.
Videodiscovery, Inc.
Prices: $495 for disc, $75 per software program, $300 for the set of five programs.

Interactive Videodisc Science Instruction Project
Developed by Nebraska Videodisc Group for the Corporation for Public Broadcasting and Annenberg School of Communications.

Lesson 1. Respiration
The videodisc is used to simulate laboratory apparatus, which allows the student to subject an organism to different temperatures and pressures. The student can project how respiration will be affected by these variables and observe the organism to see if the predicted outcome was correct.

Lesson 2. Climate and Life
The student observes the characteristics of different climatic environments on earth and studies the plant and animal life of each environment. Predictions must then be made as to the types of organisms that would likely be found in a given environment. Students must construct climatograms of those environments.

Hardware Requirements:
Pioneer LD-V1000 player
Pioneer SIA interface
Two color television monitors

Option #1:
Apple II, II+ or IIe (48K)
CP/M 2.0 or greater, slot independent
16K RAM card, slot 0 (II, II+)
Serial interface card, slot 2
80 column board, slot 3

Option #2
IBM-PC (64K)
Serial interface card
RS-232 cable

Programed CAV
Software: written for IBM-PC and Apple
GPN
Price: $425 for disc with manual and software.

SCIENCE INSTRUCTION—CHEMISTRY

Interactive Videodisc Science Instruction Project
Developed by Nebraska Videodisc Group for the Corporation for Public Broadcasting and Annenberg School of Communications.

Lesson 1. Titration
The videodisc is used to simulate titration experiments with all the necessary equipment. The student has control of the variables in each experiment allowing for thousands of possible titration experiments.

Lesson 2. Unknowns
The student is asked to determine the chemicals used to obtain a given reaction. Hundreds of chemical reactions are available for the student to view, permitting the student to observe how known chemicals react with each other.

Hardware Requirements:
Pioneer LD-V1000 player
Pioneer SIA interface
Two color television monitors

Option #1
Apple II, II+ or IIe (48K)
CP/M 2.0 or greater, slot independent
16K RAM card, slot 0 (II, II+)
Serial interface card, slot 2
80 column board, slot 3

Option #2
IBM-PC (64K)
Serial interface card
RS-232 cable

Programed CAV
Software: written for IBM-PC or Apple
GPN
Price: $425 for disc with manual and software.

Standard Heats of Solution
An interactive general chemistry prelaboratory experiment at the college freshman level. The program contains self-evaluation quizzes and remedial segments.

Hardware Requirements:
Pioneer PR-7820

Programed CAV
Software: Level Two encoded on disc
UCLA Instructional Media Library
Price: $150

SCIENCE INSTRUCTION—PHYSICS

The Puzzle of the Tacoma Narrows Bridge Collapse
This disc introduces students to the physics of wave motion and resonance. Three levels or tracks of instruction are available on the disc. Five instructional units offer both experiments and actual footage of the bridge collapse.

1. Introduction to the Player
This explains the use of the Pioneer PR-7820 (Level Two) player in interactive instruction.

2. Tacoma Narrows Bridge Collapse
Eyewitness reports make up the narration for this live footage that is not otherwise available.

3. Influence of the Wind
Lab experiments are used to recreate actual conditions.

4. Importance of Physical Properties
Live film and lab experiments demonstrate the principles of physics needed to understand the collapse.

5. Conclusion

Programed CAV
Software: encoded on disc (Level Two)
John Wiley & Sons, Inc.
Price: $150

Interactive Videodisc Science Instruction Project
Developed by Nebraska Videodisc Group for the Corporation for Public Broadcasting and Annenberg School of Communications.

Lesson 1. Studies in Motion
The student is shown video segments of dance, diving, and gymnastics to study motion. Linear momentum, angular momentum, gravitational potential energy, center of mass, and moment of inertia can be determined through equations.

Lesson 2. Energy Transformation
Through the use of different bicycles, the student can calculate conservation of energy, the effects of friction, wind resistance, tire inflation, and mass of the rider.

Hardware Requirements:
Pioneer LD-V1000 player
Pioneer SIA interface
IBM-PC (64K)
Serial interface card
RS-232 cable
Video Associates Labs Microkey system
One color monitor

Programed CAV
Software: written for IBM-PC
GPN
Price: $425 for disc with manual and software.

Frames of Reference
Various motions viewed from inertial and noninertial frames of reference are presented in this videodisc, which vividly demonstrates the appearance of fictitious forces.

Hardware Requirements:
Apple II+ or IIe computer
Videodisc player:Pioneer PR-8210, LD-1100, or VP-1000; Magnavox VC-8010; or Sylvania VP-7200
VideoVision VAL-135 interface.

Programed CAV
Software: Written for Apple II+ or IIe
Central Scientific Company
Prices: $210 with program, $165 for disc alone.

Photons and Interference of Photons
The first part of the disc shows an experiment with very weak light, and demonstrates that even weak light can eject electrons without delay, suggesting that radiant energy comes in packages. The second part demonstrates that even very weak light, which was shown to carry energy like a particle, produces interference patterns characteristic of waves.

Hardware Requirements:
Apple II+ or IIe computer
Videodisc player: Pioneer PR-8210, LD-1100, or VP-1000; Magnavox VC-8010; or Sylvania VP-7200
VideoVision VAL-135 interface.

Programed CAV
Software: written for Apple II+ or IIe
Central Scientific Company
Prices: $250 with program, $195 for disc alone.

SCIENCE INSTRUCTION—SPACE SCIENCES

Space Archive Volume 1, Space Shuttle
This disc contains an audiovisual documentation of the space shuttle STS 5, 6, and 7 missions. The program features the following events:
- Solid rocket booster staging, freefall, parachute deployment, splashdown and recovery
- Flight deck views of reentry
- On-orbit launch of communications satellites
- Space walks of Story Musgrave and Don Peterson
- Deployment and retrieval of the SPAS pallet satellite, including remote video views of the Shuttle from SPAS
- Housekeeping on the Shuttle, including techniques for shaving, eating and sleeping in zero gravity
- Still photo collection of mission activities and out-the-window views of Earth
- Comments by Commanders Vance Brand and Paul

Weitz, and Mission Specialists Joe Allen, Sally Ride, and John Fabian

Interactive CAV
Software: none available
Video Vision Associates, Ltd.
Price: $39.95

Space Archive Volume 2, Apollo 17 Mission to Taurus Littrow
This disc takes the viewer to the surface of the moon with the first exploration team ever to set foot on it. This disc is a must for the science classroom to see the effects of low gravity on a planet. The disc contains live footage and stills of the lunar surface and the astronauts performing their experiments.

Interactive CAV
Software: none available
Video Vision Associates, Ltd.
Price: $39.95

Space Archive Special Edition Shuttle Downlink: The Repair of Solar Max
This disc has live footage and still frames of one of the latest Shuttle missions. The disc has excellent color pictures with superb clarity of the astronauts walking in space as well as in the weightless cabin. The disc has some of the best blast-off footage to date. The disc also features more prompts for the viewer to take advantage of the interactive nature of the medium.

Interactive CAV
Software: none available
Video Vision Associates, Ltd.
Price: $39.95

Space Archive Volume 3, Mars and Beyond
This disc is unique in the series of space discs in that it includes footage in 3-D. Two pairs of 3-D glasses are provided with the disc. Side one documents the Viking mission to Mars with over 500 photos and 20 minutes of video (14 minutes in 3-D). Mission photos from Voyager document the planets of Jupiter and Saturn. Side two includes a 25-minute film "Voyager" that was produced by the Jet Propulsion Lab.

Interactive CAV
Software: none available
Video Vision Associates, Ltd.
Price: $39.95

Space Disc 1. Voyager
The Center for Aerospace Education at Drew University, in cooperation with NASA Education Services, put this series of discs together that document outer space and this country's exploration of the space frontier. The discs come with a reference manual and image directory.
- General information movies
- Computer-generated mission profile movies for Jupiter, Saturn, Uranus, and Neptune encounters
- Spacecraft development and assembly
- Descriptions and results of all 11 experiments
- 16 data animation movies of the rotation of Jupiter, the Red Spot, Saturn, and Saturn's rings
- Comprehensive coverage of the imaging science experiment, prepared by Dr. Reta Beebe
- Physical data, scale and USGS topographic maps (when available) for each object encountered
- Single-concept programing segments, such as the Deep Space Network, MTIS image display system
- Galileo mission profile movie
- Includes the Space Archive Volume 3 disc

Programed CAV
Software: written for Apple IIe
Video Vision
Price: $360 for two discs

Space Disc 2. Apollo
The Center for Aerospace Education at Drew University, in cooperation with NASA Education Services, put this series of discs together that document outer space and this country's exploration of the space frontier. The discs come with a reference manual and image directory.
- Approximately 10,000 NASA photos of the Apollo 11, 12, 13, 14, 15, 16, and 17 missions
- Astronaut training
- Spacecraft preparation
- Mission and recovery
- Onboard photographs shot by the astronauts
- Movie highlights of each mission
- Launching and docking sequences
- Out-the-window views from lunar orbit and during descent and EVA activity
- Includes the Space Archive Volume 2 disc

Programed CAV
Software: written for Apple IIe
Video Vision
Price: $360 for 2 discs

Space Disc 3. Shuttle
The Center for Aerospace Education at Drew Universi-

ty, in cooperation with NASA Education Services, put this series of discs together that document outer space and this country's exploration of the space frontier. The discs come with a reference manual and image directory.

- Approximately 3,400 NASA photos of the STS development
- Onboard photography from STS 1, 2, 3, and 4
- Developmental movies, including approach and landing tests and propulsion test firing
- Engineering movies, including launch, ET separation
- Out-the-window views of launch and landing
- Staging views from orbit, cargo bay, manipulator arm experiments, and cabin interior
- Landing video from chase planes
- Includes Space Archive Volume 1 and the Space Archive Special Edition Shuttle Downlink discs

Programed CAV
Software: written for Apple IIe
Video Vision
Price: $400 for 3 discs

Space Disc 4. The Sun
The Center for Aerospace Education at Drew University, in cooperation with NASA Education Services, put this series of discs together that document outer space and this country's exploration of the space frontier. The discs come with a reference manual and image directory.

- Pictoral glossary of all solar system bodies
- Planetary exploration by spacecraft
- Cosmogony and comparative planetology still images and movie clips
- Motion of sky from Earth, including star trails, retrograde motion, seasons, and lunar phases
- Collection of solar stills
- Movie clips of sunspots, prominences, flares, rotation, and eclipse
- Photographs of observatories and collections from their public files and archives
- Glossary of deep sky objects
- Movie clips of big bang, animation of stellar evolution, pulsars, and black holes

Programed CAV
Software: written for Apple IIe
Video Vision
Price: $320 per disc

Space Disc 5. Astronomy
The Center for Aerospace Education at Drew University, in cooperation with NASA Education Services, put this series of discs together that document outer space and this country's exploration of the space frontier. The discs come with a reference manual and image directory.

- Stills of NASA launch record, including mission description, launch vehicle, payload, and recovery
- Historically significant movie clips, including V2 testing, Vanguard, Explorer, Shepard, Glenn, Kennedy speech, Ranger lunar impact, White space walk, Gemini rendezvous, Apollo 8 lunar orbit, Apollo 11 landing, Armstrong step, Skylab repair, Mars landing, Apollo/Soyuz handshake, and so on
- Spinoff technology overview
- Satellite applications
- NASA aeronautics, including historical materials from Langly, Lewis, Ames and Dryden
- Aircraft development, including design, wind tunnel, and flight testing

Programed CAV
Software: written for Apple IIe
Video Vision
Price: $400

Space Disc 6. Earth Science
The Center for Aerospace Education at Drew University, in cooperation with NASA Education Services, put this series of discs together that document outer space and this country's exploration of the space frontier. The discs come with a reference manual and image directory.

- Terrestrial geoscience, including plate tectonics volcanism, surface features, and rock studies
- Lunar sample and meteorite studies
- Comparative planetology, including crater studies, surface mapping of terrestrial-like bodies
- U-2 high-altitude photography, including 100 largest American cities
- Gemini, Apollo, Skylab, Apollo/Soyuz earth-looking photography
- Comprehensive LandSat coverage, including the U.S.A., Alaska, selected global regions, seasonal comparisons, and special mosaics
- Imaging radar studies from Seasat and STS 2
- Advanced analysis and mapping techniques

Programed CAV
Software: written for Apple IIe
Video Vision
Price: to be announced

Space Disc 7. Space Age
The Center for Aerospace Education at Drew University, in cooperation with NASA Education Services, put

this series of discs together that document outer space and this country's exploration of the space frontier. The discs come with a reference manual and image directory.

Programed CAV
Software: written for Apple IIe
Video Vision
Price: to be announced

Planetary Image Videodisc
This disc is a reference archive of 100,000 black and white still frames of planetary images from the Jet Propulsion Laboratory.

Interactive CAV
Software: not available at this time
National Technical Information Service, catalog # PB83–223131
Price: $50.00 (American Express, MasterCard, and Visa accepted)

Selected NASA-JPL Mission Videoimages
This disc is a reference archive of black and white and color planetary images from the Jet Propulsion Laboratory.

Interactive CAV
Software: not available at this time
National Technical Information Service, catalog # PB83–223123
Price: $50.00 (American Express, MasterCard, and Visa accepted)

SPECIAL EDUCATION—SIGN LANGUAGE

Deaf Awareness: Let Your Fingers Do the Talking
This disc is designed to teach sign language to communicate with the hearing impaired. The videodisc, along with a support manual, includes both instructional and testing segments on the manual alphabet, simple numbers, word signs, and phrases. The disc captures the crucial elements of motion that are otherwise difficult to convey through the conventional method of learning from a series of still photographs. The program combines the benefits of personal instruction with feedback to provide the most advanced and effective methods of teaching the communication skills of sign language.

Programed CAV
Software: program encoded on disc (Level Two)
Hardware: Sony LDP-1000
ACCESS Alberta
Price: $225

SPECIAL TOPICS

Discursions
This disc is a sample of different applications for the videodisc technology. Each of its 16 demonstrations is organized into a chapter that contains a slide show, a motion video segment, and digitally encoded text from relevant publications. These demonstration segments range in length from 40 seconds to seven minutes, and are located on both sides of the disc.

Side 1
Chapter 1. Table of contents and introduction to the disc.
Chapter 10. Interactive Movie Map (Aspen). This is a dynamic, interactive map, based on videodisc technology, which the viewer uses to take a simulated drive through an unfamiliar space.
Chapter 11. Movie Manual. This section demonstrates how the technology might be used as an electronic book.
Chapter 12. Communication News. This section simulates a personal electronic newspaper.
Chapter 13. Desk File. Desk file explores electronic mail.
Chapter 14. Talking Heads. Three-dimensional projections with sound-sync and dynamic spatial correspondence are explored.
Chapter 15. Zero Bandwidth Video. Several teleconferencing techniques are explored.
Chapter 16. Lip Sync. Experiments in lip sync techniques.
Chapter 17. Charicature Generator. This program uses a computer to create charicatures.

Side 2
Chapter 20. Phone Slave. This section demonstrates a personalized telecommunications system that works with voice and electronic mail messages.
Chapter 21. Put That There. A voice and gesture interactive system.
Chapter 22. Graphical Marionette. This section explores a method of capturing human motion.
Chapter 23. Archfile. A visual database of 5,000 records of American architecture.
Chapter 24. Picassofile. A visual database of 700 Picasso works stored by style, period, location and subject.
Chapter 25. Viewpoint Dependant Imaging. This section simulates viewing a three-dimensional environment.

Chapter 26. Stereoscopic Workspace. This chapter explores the use of a three-dimensional digitizer.
Chapter 27. Facemaker. This section demonstrates the use of videodisc for creating composite faces from a catalog of facial features.
Chapter 30. Disc Design. An overview of the disc.
Chapter 31. Digital Data. Description of how the data sections of the disc were created.
Chapter 32. Bibliography.
Chapter 33. Mapping by Yourself (Do-It-Yourself Aspen). This section allows the user to create an interactive mini-movie map with Aspen footage.
Chapter 34. ArcMan in Action (24 Hours at the 'Mac). This is a documentation of one day at the Architecture Machine Group terminal garden in still-frames.
Chapter 35. ArcMac Slidathon. A collection of over 3,000 still images.

Interactive CAV
Software:
Architecture Machine Group
Price: $100

TELEVISION

Photo Store
One of America's top photo agencies, Uniphoto Picture Agency of Washington, and Meta Media Systems, Inc., have combined to produce the Photo Store, a distinctive video and communications tool. Tens of thousands of high-quality color transparencies covering the entire range of contemporary stock photography are contained on this disc. Direct processing from the videodisc means that no external time base corrector is needed to produce a broadcast quality image. One annual licensing fee allows the use of any image for editorial video production, and many photos are released and available for commercial use on a per use basis. The disc comes with a full color catalog/index so images can be found quickly with any videodisc player. Image Search software for the IBM-PC computers is available.

Interactive CAV
Software: available with IBM-PC computers
Picture Management Systems
Price:

APPENDIX G. DIRECTORY OF VIDEODISC MASTERING OPTIONS

VIDEODISC SHARING

APh Technological Consulting
55 North St. John Avenue
Pasadena, CA 91103
(818) 796-0331

Comsell, Inc.
500 Tech Parkway
Atlanta, GA 30313
(404) 872-2500;–(800) 438-4100

IICS (International Interactive Communications Society)
726 Marion Avenue
Palo Alto, CA 94303
(415) 324-3410

Learning Link Corporation
Laser Disc Training and Information Systems
Suite 111
2880 South Main
Salt Lake City, Utah 84115
(801) 466-9276

3rd Wave Media Consultants
Suite 206
1600 Notre Dame West
Montreal, Quebec
Canada H3J 1M1
(514) 932-9885

SMALL VOLUME VIDEODISC MASTERING FACILITIES

LaserVideo, Inc.
One East Wacker Drive
Chicago, IL 60601
(312) 467-6755

Spectra Image
540 North Hollywood Way
Burbank, CA 91505
(808) 842-1111

LARGE VOLUME VIDEODISC MASTERING FACILITIES

Pioneer Video, Inc.
Suite 300
5150 East Pacific Coast Highway
Long Beach, CA 90804
(213) 498-0300

Sony Video Communications
Sony Drive
Park Ridge, NJ 07656
(201) 930-1000

Technidisc
2250 Meijer Drive
Troy, MI 48084
(313) 435-7430

3M Optical Recording Project
223–5S 3M Center
St. Paul, MN 55144
(612) 733-4435

Comparison of Mastering Costs
Set Up Costs Per Disc Side

Company	CAV	CAV*MDSD/	CLV
Pioneer	$2,100	$2,400	$2,400
Sony	$2,000	$2,000	$2,000
Technidisc	$1,500	$2,000	$2,000
3M	$1,800	$2,500	$2,500

Cost Per Disc

Company	Qty	CAV 1sd	CAV 2sd	CAV* 1sd	CAV* 2sd	CLV 1sd	CLV 2sd
Pioneer	1000	$10	$15	$14	$19	$14	$19
	1000	$ 7	$12	$10	$15	$10	$15
Sony	249	$19	$30	$19	$30	$19	$30
	499	$18	$26	$18	$26	$18	$26
	999	$16	$25	$16	$25	$16	$25
	1999	$15	$24	$15	$24	$15	$24
	2999**	$14	$23	$14	$23	$14	$23
Technidisc	49	$18	$23	$18	$23	$18	$23
	199	$16	$21	$17.50	$22.50	$16	$21
	499	$14	$19	$17	$22	$14	$19
	999	$12	$17	$16.50	$21.50	$12	$17
	1499	$11	$16	$16	$21	$11	$16
	1999	$10	$15	$15	$20	$10	$15
3M	99	$18	$23	$18	$23	$18	$23
	499	$14	$20	$18	$23	$14	$20
	999	$12	$17	$18	$23	$12	$17
	1499	$10	$15	$15	$21	$10	$15
	1999**	$10	$15	$15	$21	$10	$15
	2499**	$ 8.50	$12.50	$12	$17	$ 8.50	$12.50
	4999**	$ 6.75	$10.50	$ 6.75	$10.50	$ 6.75	$10.50

* CAV with digital programing

** No set up charge for discs without digital programing

APPENDIX H. DIRECTORY OF INTERACTIVE AUTHORING LANGUAGES

Allen Communications
Quest Authoring System

Features

- No knowledge of programing necessary
- Capable of dot-by-dot color graphics
- Quick creation of shapes and animation, advanced text video and audio features
- True/false, multiple choice, and fill-in-the-blank formats available
- Unequalled range of branching capabilities
- Student data management options
- Student feedback options
- Simple set of commands
- Prompts displayed at all times
- Lessons easily modified
- Manual with tutorials provided
- Allows the use of touch screens, light pens, and key pads

Prices:
$1,295 for IBM-PC and compatibles with video features
$995 for IBM-PC compatibles without video features
$995 for Apple IIe, IIc with video features
$895 for Apple IIe, IIc without video features

Interactive Training Systems
Authority Authoring Language

Features

- No programing expertise necessary
- Provides second-generation authoring capability
- Supports video and text-based course development
- Provides highly productive course development tool
- Includes competency-based educational formats
- Promotes effective consistant course design
- Supports advanced video implementation
- Dramatically reduces overall course development costs
- Completely menu-driven
- Sophisticated student record management included
- Supports light pen and touch screen

Price: $12,000

Interactive Video Concepts
Pharos Authoring Language

Pharos is designed to be used with an Apple II+ (DOS 3.3) or any Applesoft compatible microcomputer with two disc drives and 16K language card, driving a Sony LDP-1000 or Pioneer PR-7820 industrial/educational videodisc player through the Allen VMI or other appropriate interface system.

Software Package includes:
Master diskette
Pharos tutorial diskette
PHAROS manual

Price: $595

JAM Incorporated
JAM Disc Writer Course Authoring System

Features

- For use with IBM-PC or Apple computers with 128K RAM
- Available for MS DOS 1.1 and MS DOS 2.0
- No programing knowledge necessary
- User's guide gives step-by-step instructions
- Online testing and record keeping capabilities
- Prints management reports
- Menu based system

Price: $395

Online Computer Systems, Inc.
Pilot Plus Authoring Language

Features

- Pilot Plus is supported on CP/M 2.2 Z80-based systems and IBM-PC or other computers that use 8088 or 8086 processors
- Available for MS DOS, PC-DOS, and CP/M 86 operating systems
- Supports color graphics, videodisc, and sound technologies
- Full screen editor for creating or modifying materials
- Online testing and record keeping capabilities
- Easy to use

Price: $1,000

University of Utah
VCIS—Video-Computer Courseware Implementation System

Features

- No programing required
- Create and edit text and graphics
- Build and revise courseware
- User options always displayed
- Analysis of student response data available
- Complex branching routines available
- Fully transportable on the following systems: IBM-PC (MS-DOS V.2), Zenith Z-100 (MS-DOS V.2), Terak 8510A (UCSD Pascal), HP9836 (HP Pascal), and Vax 11/750 (Berkley UNIX)
- Courseware can be developed for one-third the normal cost

Prices:
$1,375 for one-year license to educational institution
$5,500 for one-year license to other organizations

Video Vision Associates LTD
Laser Write Authoring Language

Features

- Capable of highly structured branching routines
- Mix and match captions, true/false questions, and multiple choice items with or without the laser disc player online
- No programing experience necessary
- Programs can be edited with the Laser Write editor or Apple Works word processing program

Price: $75

Whitney Educational Services
A 128-A Insight 2000 Plus Authoring Language

Features

- Compatible with Apple computers
- 35 levels of branching
- 10 levels of unit nesting
- Options for multiple choice, true or false, or fill-in-the-blank questions with unlimited responses
- Student control can be available at any time
- Student response storage file
- Built-in diagnostic features

Price: $990

Whitney Educational Services
PC-227A Insight-PC Plus Authoring Language

Features

- For use with IBM compatible computers
- 35 levels of branching
- 10 levels of unit nesting
- Options for multiple choice, true or false, or fill-in-the-blank questions with unlimited responses
- Student control can be available at any time
- Student response storage file
- Built-in diagnostic features

Price: $990

Whitney Educational Services
SM 327 Insight 70 Authoring Language

Features

- Compatible with Sony SMC-70 computers
- Supports the SMC-70 superimpose functions
- 35 levels of branching
- 10 levels of unit nesting
- Options for multiple choice, true or false, or fill-in-the-blank questions with unlimited responses
- Student control can be available at any time
- Student response storage file
- Built-in diagnostic features

Price: $895

Option
SM 327-D videodisc controller only ($495)

APPENDIX I. SERVICE INFORMATION

Warrantech Corporation
805 Third Avenue
New York, NY 10022
(212) 319-8383

Approximate Costs for Selected Videodisc Related Items

Item	Length of Contract	Carry-in Service	On-site Service
Videodisc Player	1 yr	$ 42	
	2 yrs	$ 84	
	3 yrs	$115	
TV Monitor (less than 19 in)	1 yr	$ 40	$ 50
	2 yrs	$ 80	$ 90
	3 yrs	$120	$130
TV Monitor (19 in or larger)	1 yr		$ 50
	2 yrs		$100
	3 yrs		$150
TV Projector	1 yr		$100
	2 yrs		$200
Microcomputer Items	per/yr	$100*	$150**
Audio System (up to 5 components)	1 yr		$ 50
	2 yrs		$ 90
	3 yrs		$130

* or 12% of retail price, whichever is greater
** or 15% of retail price, whichever is greater

APPENDIX J. VIDEODISC RESOURCES

BIBLIOGRAPHY

This bibliography is a collection of books, periodicals, conference proceedings, and special publications pertaining to the subect of videodiscs. Although very few books have been written about videodiscs, those on the market range from historical accounts of the technology to production guides for interactive programing. The bulk of the information concerning the applications of the technology, and the specific problems encountered in daily use, is contained in the periodicals. The periodicals listed here are either fully devoted to videodisc technology or have frequent articles that are helpful in understanding the different aspects of videodisc use. Several fields offer publications that discuss the videodisc technology: professional television, educational media, computer-assisted instruction, and optical disc technology. As each of these areas has different readers, it is often interesting to see the many different perspectives from which the technology can be viewed.

Books

Bennion, Junious L., and Edward W. Schneider. *Videodiscs*. Educational Technology Publications, Inc., Englewood Cliffs, New Jersey 07632, 1981.

Daynes, Rod, and Beverly Butler. *The Videodisc Book*. John Wiley & Sons, Inc., PO Box 063, Somerset, New Jersey 08873. 1984. $89.95.

DeBloois, Michael L. *Effectiveness of Interactive Videodisc Training*. Learning Link Corporation, 2880 South Main Street, Suite 111, Salt Lake City, Utah 84115, 1985. $25.

DeBloois, Michael L. *Videodisc/Microcomputer Courseware Design*. Educational Technology Publications, Inc., Englewood Cliffs, New Jersey 07632, 1982.

Floyd, Steve, and Beth Floyd. *Handbook of Interactive Video*. Knowledge Industry Publications, 701 Westchester Avenue, White Plains, New York, 1983. $34.95.

Gayeski, Diane M. *Corporate and Instructional Video Design and Production*. Prentice-Hall, Englewood Cliffs, New Jersey 07632, 1983. $21.95

Iuppa, Nicholas V. *A Practical Guide to Interactive Video Design*. Knowledge Industry Publications, Inc., 701 Westchester Avenue, White Plains, NY 10604, 1984. $34.95.

Kindelberger, Charles. *Interactive Video—1984*. Applied Video Technology, Inc., 5118 Westminster Place, St. Louis, Missouri 63108; phone (314) 569-9144. $31.50 or $45.50 with future supplement included.

Sigel-Schubin-Merrill. *Video Discs*. Van Nostrand Reinhold Company, 135 West 50th Street, New York, New York 10020, 1980.

Periodicals

Disc Topics, Pioneer Video, Inc., Industrial Sales Division, 5150 East Pacific Coast Highway, Suite 300, Long Beach, California 90804. Phone (213) 498-0300. Quarterly. Free.

Educational Technology, Educational Technology Publications, 140 Sylvan Avenue, Englewood Cliffs, NJ 07632. Phone (201) 871-4007. Monthly. $49/year.

E&ITV, C. S. Tepfer Publishing Company, Inc., 51 Sugar Hollow Road, Danbury, CT 06810. Phone (203) 743-2120. Monthly. $15/year, $2/single copy.

IICS Journal, 330 Townsend, Suite 206, San Francisco, CA 94107. Phone (415) 543-1630. Monthly. Free with membership to IICS (membership is $50/year)

Interactive Video Technology, 223 Sunrise Drive, Shreve, OH 44676. Phone (216) 567-3732. Monthly. $45/year.

International Television, PO Box 1229, Murray Hill Station, New York, NY 10016. Phone (212) 725-5742. Six issues per year. $13/year, $2.50/single copy.

Journal of Educational Technology Systems, Society for Applied Learning Technology, 50 Culpeper Street, Warrenton, VA 22186. Phone (703) 347-0055. Membership $25/year, Journal $31/year.

The Laser Disc Newsletter, Suite 428, 444 Hudson Street, New York, New York 10014. Phone (212) 242-3324. Monthly. $15/year, $2/single copy.

Laser Works, PO Box 250031, Los Angeles, California 90025. Bimonthly. $12/12 issues.

Medical Disc Reporter, 5219 Acacia Avenue, Bethesda, Maryland 20814. Bimonthly newsletter. $45/year.

Optical Memory Newsletter, E. S. Rothchild Publisher, PO Box 14807, San Francisco, CA 94114-0817. Phone (415) 621-6620. Bimonthly. $295/year.

Video Computing, PO Box 3415, Indialantic, FL 32903. Phone (305) 768-2778. Monthly. $130/year.

Videodisc Design/Production Group News, KUON-TV, University of Nebraska-Lincoln, PO Box 83111, Lincoln, NE 68501-3111. Phone (402) 472-3611. Bimonthly. Free.

The Videodisc Monitor, Future Systems, PO Box 26, Falls Church, VA 22046. Phone (703) 241-1799. Monthly. $195/year, $10/single copy.

Videodisc and Optical Disk Update, Meckler Publishing, 520 Riverside Avenue, Westport, CT 06880. Phone (800) 243-4223. Monthly. $96/year, $66/year with subscription to Videodisc and Optical Disk.

Videodisc and Optical Disk, Meckler Publishing, 520

Riverside Avenue, Westport, CT 06880. Phone (800) 243-4223. Quarterly. $75/year.

Video Systems, Intertec Publishing Corporation, 9221 Quivira Road, PO Box 12901, Overland Park, KS 66212-9981. Phone (913) 888-4664. Monthly. $25/ year, $3/single copy, free to video/audio professionals with purchacing authority.

Conference Proceedings

The following proceedings are available from the Society for Applied Learning Technology, 50 Culpeper Street, Warrenton, VA 22186. Phone (703) 347-0055.

Interactive Videodisc in Education and Training (1983). $35.
Microcomputers in Education and Training (1983). $40.
Educational Technology to Improve International Education and Training (1982). $30.
Public, Vocational and Industrial Education and Training (1982). $35.
Videodisc, Microcomputer and System Technologies in Education and Training (1982). $40.
Learning Technology for the 80's, (1981). $35.
Videodisc, Microcomputer and Learning System Technologies in Public, Vocational, Medical, and Handicapped Education and Training (1980). $40.

Special Videodisc Publications

Journal for Performance and Instruction, Vol.22, No.9, November 1983. National Society for Performance and Instruction, 1126 Sixteenth Street NW, Washington, DC 20036. $5.

Medical Disc Reporter Project Directory, 5219 Acacia Avenue, Bethesda, Maryland 20814. Directory $65, quarterly updates $25.

CONFERENCE AND WORKSHOP INDEX

The following is a list of organizations that hold regular workshops or conferences in the field of interactive videodisc. Many of these organizations have sessions that are specifically geared toward education and training, as well as technical sessions geared more for industrial applications of the technology and interactive video production techniques. Readers should contact each organization before attending to be sure that the workshop or convention will be appropriate to their specific needs.

Association for the Development of Computer-Based Instructional Systems (ADCIS)
Miller Hall 409
Western Washington University
Bellingham, WA 98225
(206) 676-2860

Association for Educational Communications and Technology (AECT)
1126 Sixteenth Street NW
Washington, DC 20036
(202) 466-4780

Columbia University
Office of Continuing Education
Box 132
Teachers College
New York, NY 10027
(212) 678-3147

Institute for Graphic Communication
375 Commonwealth Avenue
Boston, MA 02115
(617) 267-9425

Ithaca College
Office of Summer Sessions
Muller 210
Ithaca, NY 14850
(607) 274-3525

Knowledge Industry Publications, Inc.
701 Westchester Avenue
White Plains, NY 10604
(800) 431-1880

Meckler Publishing
11 Ferry Lane West
Westport, CT 06880
(203) 226-6967

Nebraska Videodisc Design/Production Group
KUON-TV/University of Nebraska-Lincoln
PO Box 83111
Lincoln, NE 68501-3111
(402) 472-3611

The Parke Institute
120 Central Park Plaza
2880 South Main Street
Salt Lake City, Utah 84115
(800) 221-0254
(801) 486-2348 in Utah

Society for Applied Learning Technology
50 Culpeper Street
Warrenton, VA 22186
(703) 347-0055

Society of Photo-Optical Instrumentation Engineers (SPIE)
PO Box 10
Bellingham, WA 98227-0010
(206) 676-3290

Technology Opportunity Conference
PO Box 14817
San Francisco, CA 94114-0817
(415) 626-1133

Visual Communications Congress
475 Park Avenue South
New York, NY 10016
(800) 525-9710

MANUFACTURERS INDEX

ACCESS Alberta
Instructional Technology Unit
16930 114th Avenue
Edmonton, Alberta
Canada T5M 3S2
(403) 451-3160

Actronics Inc.
810 River Avenue
Pittsburgh, PA 15212
(412) 231-6200

Allen Communications
140 Lakeside Plaza II
5225 Wiley Post Way
Salt Lake City, UT 84116
(801) 537-7800

American Technology Resources
Rose Tree Professional Center
1245 North Providence Road
Media, PA 19342
(215) 565-6434

Anthro-Digital, Inc.
103 Bartlett Avenue
Pittsfield, MA 01201
(413) 448-8278

APh Technological Consulting
55 North St. John Avenue
Pasadena, CA 91103
(818) 796-0331

Architecture Machine Group
Room 9–516
Massachusetts Institute of Technology
105 Massachusetts Avenue
Cambridge, MA 02139
(617) 253-5981

BCD Associates, Inc.
Suite 101
5809 SW Fifth Street
Oklahoma City, OK 73128
(405) 948-1293

Bell & Howell
Interactive Communications Division
7100 North McCormick Road
Chicago, IL 60645
(800) 323-4338, ext. 4118

BNA Communications Inc.
9417 Decoverly Hall Road
Rockville, Maryland 20850
(301) 948-0540

Borg-Warner Educational Systems
600 West University Drive
Arlington Heights, IL 60004
(800) 323-7577
(800) 942-6995 in Illinois

Carroll Touch Technology
2902 Farber Drive
Champaign, IL 61821
(217) 351-1700

Center for Computer-Assisted Legal Instruction
229 Nineteenth Avenue South
Minneapolis, MN 55455
(612) 373-5352

Central Scientific Company
11222 Melrose Avenue
Franklin Park, IL 60131-1364

Computer Technology Associates
New Product Division
Suite 14
1704 Moon NE
Albuquerque, NM 87112
(505) 298-0942

Comsell, Inc.
500 Tech Parkway
Atlanta, GA 30313
(404) 872-2500
(800) 438-4100 in Georgia

Control Data Corporation
8100 34th Avenue South
Bloomington, MN 55420
(612) 853-5022

Criterion Publishers
2139 Manning Avenue
Los Angeles, CA 90025
(800) 446-2001
(213) 475-3524

Delex Systems, Inc.
Suite 700
8133 Leesburg Pike
Vienna, VA 22180
(703) 734-8300

Destron
Suite 1902
180 North LaSalle Street
Chicago, IL 60601
(312) 332-6800

Digital Controls/Video Group, Inc.
Suite 200
5555 Overbrook Parkway
Norcross, GA 30093
(404) 441-3332

Digital Equipment Corporation
Educational Services
12 Crosby Drive
Bedford, MA 01730
(617) 276-4111

ECCO Incorporated
1601 East Chestnut Avenue
PO Box 659
Santa Ana, CA 92702-0659
(714) 835-6000

Electro Mechanical Systems, Inc.
801 West Bradley Avenue
Champaign, IL 61820
(217) 359-7125

Electrohome (U.S.A.) Ltd.
250 Wales Avenue
Tonawanda, NY 14150
(716) 694-3332

Electronic Systems Products, Inc.
One Tico Road
Titusville, FL 32780
(305) 269-6680

General Electric Company
Projection Display Products Operation
Electronics Park 6–206
PO Box 4840
Syracuse, NY 13221
(315) 456-2152
(315) 456-2153

GPN
Box 80669
Lincoln, Nebraska 68501-0669
(800) 228-4630
(402) 472-2007 in Nebraska

Hazeltine Corporation
10800 Parkridge Boulevard
Reston, VA 22091
(703) 620-6800

Hitachi Sales Corp. of America (Disc Players)
1290 Wall Street West
Lyndhurst, NJ 07071
(201) 935-5300

Hitachi Sales Corp. of America (Televisions)
401 West Artesia Boulevard
Compton, CA 90220
(213) 537-8383

IEV Corporation
Suite 280
254 West 400 South
Salt Lake City, UT 84101
(801) 531-0757

IICS (International Interactive Communications Society)
726 Marion Avenue
Palo Alto, CA 94303
(415) 324-3410

Inflight Services, Inc.
485 Madison Avenue
New York, NY 10022
(800) 221-1297
(212) 751-1800 in New York

The Instant Replay
479 Winter Street
Waltham, MA 02154-1216
(800) VHS-DISC
(800) VHS-BETA in Massachusetts
(617) 890-5384
(800) THE-INST in Canada

Interactive Image Technologies Ltd.
Suite 401
49 Bathurst Street
Toronto, Ontario
Canada M5V 2P2
(416) 361-0333

Interactive Media Corporation
Suite 4B
65 West 55th Street
New York, NY 10019
(212) 245-8409

Interactive Training Systems
4 Cambridge Center
Cambridge, MA 02142
(617) 497-6100

Interactive Video Concepts, Inc.
Suite 105, The Wilford Building
101 North 33rd Street
Philadelphia, PA 19104
(215) 387-0707

International Institute of Applied Technology
Suite 400
2121 Wisconsin Avenue NW
Washington, DC 20007
(202) 965-7410

JAM Incorporated
300 Main Street
East Rochester, NY 14445
(716) 385-6740

Laserdata
One Kendall Square
Building 200
Cambridge, Massachusetts 02139
(617) 494-4900

LaserVideo, Inc.
One East Wacker Drive
Chicago, IL 60601
(312) 467-6755

Laser World
533 Second Street
San Francisco, CA 94107
(800) 637-7888
(415) 957-1163 in California

Learning Link Corp.
Laser Disc Training and Information Systems
Suite 111
2880 South Main
Salt Lake City, UT 84115
(801) 466-9276

Library of Congress
American Folklife Center
Washington, DC 20540
(202) 287-6590

Maryland Center for Public Broadcasting
Owings Mill, MD 21117
(301) 356-5600

Minnesota Educational Computing Consortium
(MECC)
3490 Lexington Avenue North
St. Paul, MN 55112
(612) 481-3500

Mitsubishi Electric Sales America, Inc.
3010 East Victoria Street
Rancho Dominguez, CA 90221

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161
(703) 487-4650

NEC Home Electronics (U.S.A.) Inc.
1401 Estes Avenue
Elk Grove Village, IL 60007
(312) 228-5900

New England Technology Group
400 West Cummings Park
Woburn, MA 01801
(617) 938-8833

New Media Graphics
145 Main Street
Cambridge, MA 02142
(617) 272-8844

North American Philips Consumer Electronics Corp. (Magnavox, Sylvania)
Interstate 40 & Straw Plains Pike
PO Box 6950
Knoxville, TN 37914
(615) 521-4316

North American Philips Corporation
100 East 42nd Street
New York, NY 10017
(212) 697-3600

Online Computer Systems, Inc.
20251 Century Boulevard
Germantown, MD 20874
(800) 922-9204
(301) 428-3700 in Maryland

Optical Programming Associates
445 Park Avenue
New York, NY 10022
(212) 508-2745

Ortonville Public Schools
PO Box 147
Ortonville, MN 56278
(612) 839-6181

Personal Computer Supply
157 South Kalamazoo Mall
Kalamazoo, MI 49007
(800) 421-4157
(616) 345-8681 in Michigan

Picture Management Systems
1071 Wisconsin Avenue NW
Washington, DC 20007
(202) 338-6390

Pioneer Video
200 West Grand Avenue
Montvale, New Jersey 07645
(201) 573-1122

Pioneer Video, Inc. (Disc Mastering)
Suite 300
5150 East Pacific Coast Highway
Long Beach, CA 90804
(213) 498-0300

Raytheon Service Company
2 Wayside Road
Burlington, MA 01803
(617) 272-9300

Scott Instruments
1111 Willow Springs Drive
Denton, TX 76201
(817) 387-9514

Simon Fraser University
Videodisc Project Director
Faculty of Education, Office of the Dean
Burnaby, B.C.
Canada V5A 1S6

Smithsonian Institution
National Air and Space Museum
Records Management Division
Washington, DC 20560
(202) 357-3133
(202) 357-3391

Sony Video Communications
Sony Drive
Park Ridge, NJ 07656
(201) 930-1000

Starship Industries
605 Utterback Store Road
Great Falls, VA 22066
(703) 430-8692
(703) 450-5780

Spectra Image
540 North Hollywood Way
Burbank, CA 91505
(808) 842-1111

Superior Training Systems
114 State Street
Boston, MA 02109
(617) 523-4040

Symtec Incorporated
15933 West 8 Mile
Detroit, MI 48235
(313) 272-2950

Synetix Inc.
10635 NE 38th Place
Kirkland, WA 98033
(800) 426-7412
(206) 828-4884 in Washington

Systems Impact, Inc.
2084 North 1200 East
Logan, UT 84321
(801) 753-7973

Technidisc
2250 Meijer Drive
Troy, MI 48084
(313) 435-7430

3M Optical Recording Project
223–5S 3M Center
St. Paul, MN 55144
(612) 733-4435

3rd Wave Media Consultants
Suite 206
1600 Notre Dame West
Montreal, Quebec
Canada H3J 1M1
(514) 932-9885

UCLA Instructional Media Library
10962 Le Conte Avenue
Los Angeles, CA 90024
(213) 825-7771

University of Delaware
Videodisc Music Series
Office of Computer-Based Instruction

Newark, DE 19716
(302) 451-8161

University of Utah
Department of Computer Science
3160 Merrill Engineering Building
Salt Lake City, UT 84112
(801) 581-8224

University of Washington
Educational Assessment Center
Room 453
1400 NE Campus Parkway
Seattle, WA 98105
(206) 543-1170

Video Associates Labs
Suite 1-F
2304 Hancock Drive
Austin, TX 78756
(512) 459-5684

VideoDiscovery, Inc.
PO Box 85878
Seattle, WA 98145-1878
(206) 524-4007

Video Dynamics, Inc.
Colony Square Shopping Center
2318 South Elmhurst Road
Mount Prospect, IL 60056
(312) 593-2304

Video Vision Associates, Ltd.
7 Waverly Place
Madison, NJ 07904
(201) 377-0302

Videotek Inc.
125 North York Street
Pottstown, PA 19464
(215) 327-2292

Visage, Inc.
12 Michigan Drive
Natick, MA 01760
(617) 655-1503

Visual Database Systems
614 Been Creek Road
Scotts Valley, CA 95066-3314
(408) 438-8396

Warrantech Corporation
805 Third Avenue
New York, NY 10022
(212) 319-8383

Whitney Educational Services
1777 Borel Place
San Mateo, CA 94402
(415) 340-5818

WICAT Systems
Training Systems Division
PO Box 539
1875 South State
Orem, UT 84057
(801) 224-6400, ext.209

John Wiley & Sons, Inc.
605 Third Avenue
New York, NY 10158
(212) 850-6000